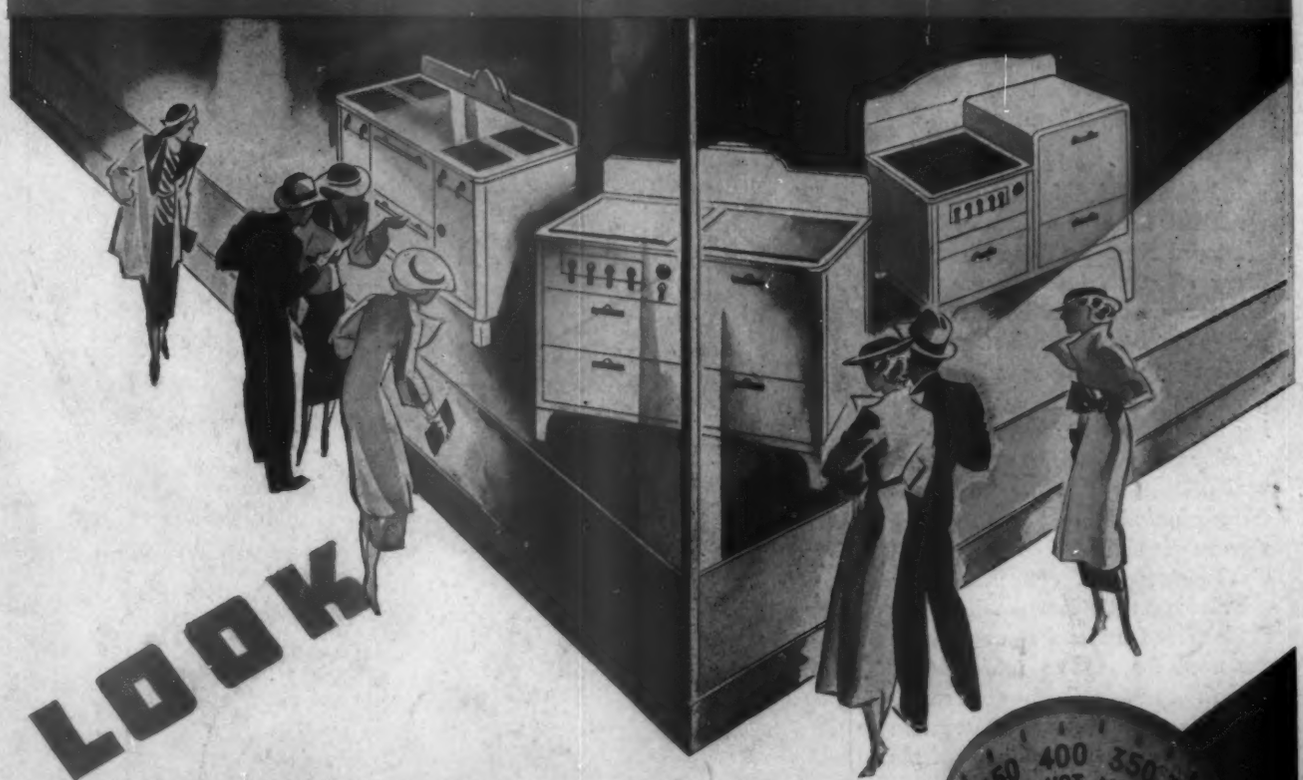
Vol. 141. No. 3 September, 1934 Price 25c

AMERICAN GAS JOURNAL

Library of Congress SEP 6 1934 Smithsonian Deposit

ROBERTSHAW "Automati-Cook"

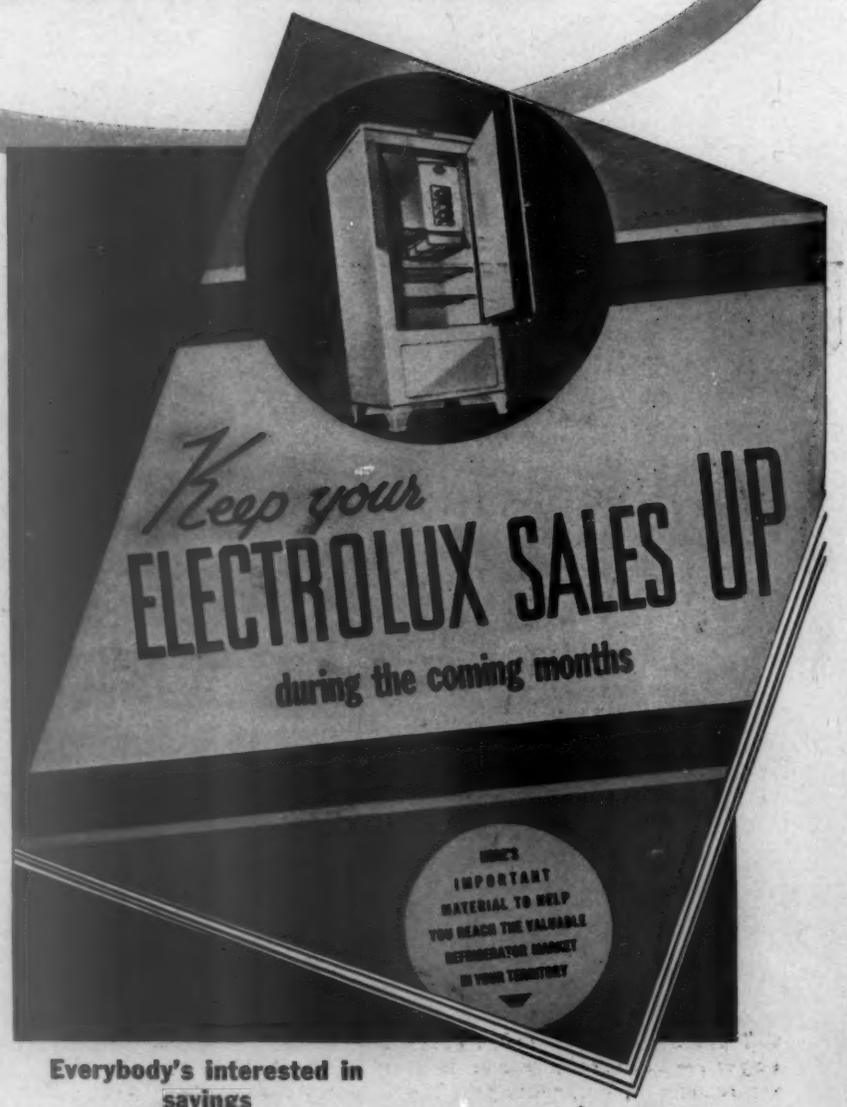


● That's a command. And thousands of women will follow it—eagerly—because it comes to them in the Robertshaw advertisements now appearing in The Saturday Evening Post. Are you ready to cash in on this advertising? With two million Robertshaw equipped gas ranges already in use—with Robertshaw advertising reaching three million able-to-buy families—the Robertshaw is a greater selling force for you this fall than ever before. Women know that controlled gas is the perfect cooking fuel—and they also know that the Robertshaw name on the dial is their assurance that the oven is under perfect control.

ROBERTSHAW THERMOSTAT COMPANY • Youngwood, Pa.

Keep your ELECTROLUX SALES UP

during the FALL MONTHS



The National Housing Act is creating a definite modernization trend. Here's how you can take advantage of it.

A BILLION DOLLARS will be released this Fall for Home renovation. The Government through the National Housing Act is bending every effort to help thousands of homeowners to make improvements during the coming months. They'll be modernizing kitchens as well as other parts of the house. They'll be thinking in terms of the new up-to-date developments for comfort and convenience. And while they're in this frame of mind it's the psychological time to get their order for a modern Gas Refrigerator.

This summer's extreme heat has made more families than ever realize the need for modern refrigeration. And right now while they are receptive, you can bring to their attention the superiority and economy of gas refrigeration.

It will pay your company to maintain your sales efforts during the coming months. Use your local newspapers. Through consistent advertising in this medium you will gain quick and certain access to the prospects in your territory and tie in with the barrage of publicity now running on Home modernization.

Everybody's interested in savings

The arresting, convincing advertisements contained in the above folder drive home the unmatched 3-way saving that makes Electrolux pay for itself. Write to us if you haven't received your copy. Electrolux Refrigerator Sales, Inc., Evansville, Ind.

NEW *Air-Cooled*
ELECTROLUX
THE SERVEL *Gas* REFRIGERATOR

AMERICAN GAS JOURNAL, September, 1934, Vol. 141, No. 3. Published monthly by American Gas Journal, Inc., at 34 Crystal St., East Stroudsburg, Pa. Executive and Editorial offices at 53 Park Place, New York, N. Y. Entered as second class matter, October 17, 1928, at the post office of East Stroudsburg, Pa., under the Act of March 3, 1879.

AMERICAN GAS JOURNAL

Established 1859

SEPTEMBER 1934

Contents

	Page
They Say	7
Protecting and Augmenting Commercial and Industrial Gas Business—E. V. Bowyer	9
Building the Househeating Load—Part III—Carl Wyckoff	13
High Pressure Storage	16
Coordinated Research and Coordinated Rate Making—Clifford E. Paige	21
The Employee in Customer's Service Work—John E. Godsoe	23
A Thermal-Conductivity Apparatus for Continuous Determination of the Helium Content of Natural Gas—Allen S. Smith	24
Dr. Haney Says	25
Potential Markets for Gas Appliances	26
Competitive House Heating Fuels and Relative Costs—H. P. Morehouse	29
Use Giant Pictures To Illustrate Window Display—Stuart Bratesman	32
Gas Serves Bridgeton Despite Severe Flood—Jacob B. Jones	33
Sales Slants	34
Technical Digest	37
The "Brobdingnagian and The Lilliputian" of Gas Boilers	38
Equipment News	39
News of the Gas Industry	40
Personals	46
Book Review	46
Trade News	48

PUBLISHED MONTHLY BY
AMERICAN GAS JOURNAL, Inc.
53 Park Place, New York

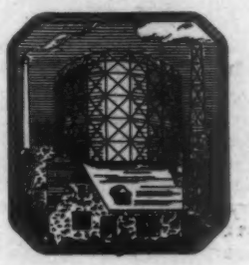
S. G. KRAKE, *President and Treasurer*
A. M. GLEASON, *Secretary*

ADVERTISING REPRESENTATIVES:
R. H. PIERCE, *53 Park Place, New York;* THOMAS MORGAN, *168 N. Michigan Ave., Chicago, Ill.;* HARLEY R. MANKIN, *9906 Theodore Ave., N.W., Cleveland, Ohio;* NORMAN C. NOURSE, *681 Market St., San Francisco, Cal.*

Subscription $2.00 per year U. S. A.; $4.00 Canada; $4.00 Foreign. Single copies 25 cts.

VOLUME 141, NUMBER 3

WHOLE NUMBER 3729



SEP 6 1934

Linde Pioneering

in Welded Pipe Lines

is a Never-Ending Quest

1914—FIRST WORLD'S FAIR to be completely supplied with high pressure gas was the Panama Pacific International Exposition at San Francisco. This gas line, some 15,000 feet of 8-inch steel tubing was oxy-acetylene welded throughout. The wonderful results of this pioneer effort in welding pipe were acclaimed with the greatest enthusiasm.

On the 75th Anniversary of the Oil Industry Linde Leadership Marks Progress with New Achievements

IN THE 75-year history of oil one of the outstanding developments has been the rapid growth of welded pipe lines. Though comparatively young when contrasted to the industry as a whole, this process of joining pipe has made rapid strides since its inception a little over 20 years ago.

Early Projects

Oxwelding of overland pipe lines first attracted the attention of the world in 1914, when it was used for the construction of high pressure gas mains at the Panama Pacific Exposition at San Francisco. Previous to this an 11-mile gas line was laid in 1911, south of Philadelphia.

First Oil Line Welded in 1920

The Prairie Pipe Line Company was first to adopt welding as standard for its lines. This pioneer effort was started with Linde products in December, 1920, with the laying of a 15-mile, 8-inch oil-carrying line from Bartlesville, Okla., to the Cherokee Station, near Ramona, Okla. A little later this company laid the first long welded oil pipe line in the United States, 140 miles from Mexia to Hensley, Texas.

For his original work in connection with these two projects, Mr. N. E. Wagner, Superintendent of Welding for the company, was awarded the Morehead Medal by the International Acetylene Association in 1923.

Original Lines Still in Service

Today, these first oil lines welded by the oxy-acetylene process are still rendering satisfactory service . . . operating almost continuously.

Welding Quickly Spreads

From these early beginnings oxy-acetylene welding and cutting has quickly superseded older methods of laying pipe lines. In 1924, the size of pipe being welded was increased from 8- and 10-inch oil lines to 16- and 18-inch gas lines welded by the Magnolia Gas Company and then to 20-inch by that company and the Lone Star Company in the following year or two. From then on, larger and larger pipe lines were welded up to the 26-inch lines of today. These lines that carry oil, gasoline and gas from the fields to the refining plants or city mains are sometimes over a thousand miles long. They are buried in ditches on land, but frequently they have to be laid across river-bottoms or swamps and in the sea. Needless to say, the thousands of joints in these lines have to be absolutely leakproof otherwise, valuable gas and oil would be lost, and miles of pipes would have to be dug up for repair.

Standard Construction Today

Today, practically every important pipe line is welded. Welding is the proved and accepted method with leading pipe line companies and contractors. They know that once a pipe joint has been welded and tested, it will last as long as the pipe itself. Striking proof of this has been found when terrific floods or earthquakes have torn and broken the pipe itself without as much as cracking the welded joints. Many times welded pipe lines were the only ones not completely torn apart and ruined.

Linde Constantly Fosters Progress

Much of the progress of oxy-acetylene welding and cutting in pipe line construction has been fostered by The Linde Air Products Company. Linde engineers are constantly striving in a never-ending quest for improvement in welding and cutting techniques, materials, rods, gases and equipment.

Develops Speed Lindewelding

Linde developed Lindewelding—a new technique—that doubles or triples the daily production of sound welded joints. It assures stronger pipe joints through a better and faster method of oxy-acetylene welding. It saves 35 to 40 per cent in materials, 30 to 60 per cent in time.

Lindewelder Increases Production

The Lindewelder was another improvement brought out by Linde. This appliance further increases the speed of Lindewelding, and makes the operation almost automatic. Other advances include the Multi-Flame Head for Lindewelding and the Wagner Pipe Cutting Machine for cutting and beveling pipe in the taking up and reclamation of old pipe lines.

Uses of Welding and Cutting Limitless

Oxy-acetylene welding and cutting may be truly termed the process of a thousand uses. In addition to its wide field of application on pipe lines and gathering systems, it is also used extensively for the erection of storage and gasoline plants and in refineries. Typical applications include: heat exchangers, piping of all sizes, vapor lines, condenser lines, structural steel work, absorbers, coils in cooling towers.

Oxwelding and cutting effect large savings in repair work and the salvaging of old equipment and abandoned pipe lines.

The oxy-acetylene blowpipe also is used to hard-face cutter bits and other equipment subject to wear. A coating of wear-resisting metal such as Haynes Stellite, Haystellite Composite Rod, High Strength bronze or High Test steel on the points of wear increases the productive life of parts 2 to 10 times.

March of Progress

Woven into the seventy-five year's history of the petroleum industry is the pioneering work done in the past two decades by the men who typify Linde Process Service. It is a truism that the important advances made in any industry during its continued growth are due as much to the unselfish efforts of men as improvements in materials and processes.

What is Linde Process Service?

Linde men on the firing line exemplify and crystalize a service rendered above and beyond the purchase of tangible goods. They are the direct contact in the field. They work closely with users of Linde Oxygen, assist them in training and qualifying operators and help organize the most efficient welding operations. Yet, this is only the visible evidence of what Linde Process Service means. Linked to the army of service operators are the combined efforts of scientists, engineers and metallurgists constantly working toward improvements in welding technique, materials and apparatus.

Back of the service operators come service supervisors, resident engineers, consulting, development and research engineers. Their work is highly important. Hundreds of practical and theoretical problems in metallurgy and in the application of the oxy-acetylene process for pipe line work are constantly studied by these men. The results of these studies enable Linde service operators to give greater service to Linde customers by bringing to their jobs the latest and best pipe line welding methods.

Linde Cooperation Continuous

Linde has a continuing interest in its customers. It exerts every facility to assure them the highest satisfaction and most profitable use of the Linde products they buy. The nearest Linde Sales Office will be glad to tell you how Linde Process Service can be of help to you. Without cost or obligation, it will gladly furnish complete data to users of Linde Oxygen on welding piping methods. It will make available also such further technical assistance your engineers or construction men may require. Linde Sales Offices are located at Atlanta, Baltimore, Birmingham, Boston, Buffalo, Butte, Chicago, Cleveland, Dallas, Denver, Detroit, El Paso, Houston, Indianapolis, Kansas City, Los Angeles, Memphis, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Phoenix, Pittsburgh, Portland, Ore., St. Louis, Salt Lake City, San Francisco, Seattle, Spokane, and Tulsa. Everything for oxy-acetylene welding and cutting—including Linde Oxygen, Prest-O-Lite Acetylene, Union Carbide and Oxweld Apparatus and Supplies—is available from Linde through 126 producing plants and 859 warehouse stocks.

The Linde Air Products Company

Unit of Union Carbide and Carbon Corporation

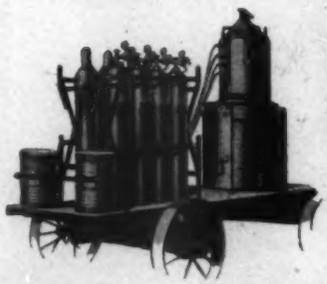
UCC

In Canada, Dominion Oxygen Co., Ltd., Toronto

PRODUCT OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION

You are cordially invited to visit the welding demonstrations and the numerous other exhibits sponsored by the Corporation in both the Basic and Applied Science sections in the Hall of Science at Chicago's 1934 A Century of Progress Exposition. Here you will see how users of oxy-acetylene welding and cutting, and other products and processes developed by Units of Union Carbide and Carbon Corporation benefit from a most unique coordination of scientific research with manufacturing, sales and service facilities.

You can order everything for Pipe Line Welding from Linde



LINDE OXYGEN . . . available in any amount from plants and warehouse stocks in all industrial centers.

PREST-O-LITE ACETYLENE . . . ready to use—the standard dissolved acetylene for well over a quarter of a century.

OXWELD APPARATUS AND SUPPLIES . . . Oxweld offers the maximum value in oxy-acetylene equipment. Blowpipes, regulators, acetylene generators, welding rods, and supplies—are available for every welding and cutting operation. Complete stocks and service stations are located in all principal cities.

UNION CARBIDE . . . sold in the familiar Blue and Grey drum from over 250 warehouse stocks.

· HIGHLIGHTS IN WELDING HISTORY ·

1920—MAKING HISTORY—The last weld being made at Cherokee Station, near Ramona, Okla., on the first oil line to be welded. This 15-mile, 8-inch line is still giving satisfactory service.

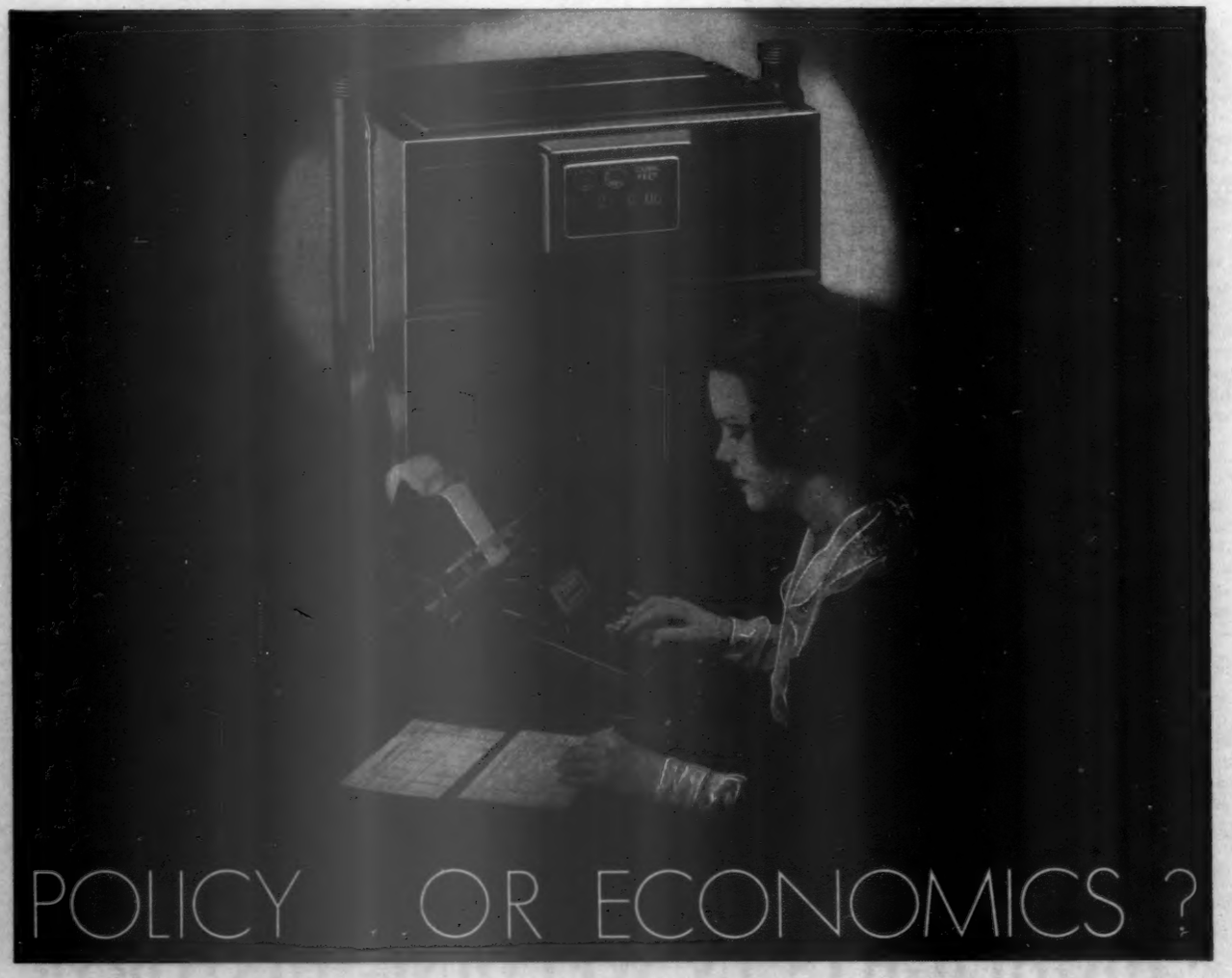
1921—FIRST LONG welded oil pipe line in the United States, 140 miles from Mexia to Hensley, Texas. Today, this line is still on the job and many thousands of miles of welded pipe lines cover the country.

1930—NORTH TO SOUTH—On the 24-in. gas pipe line from Amarillo, Texas to Chicago, Ill., oxy-acetylene welding did its part to assure a long-lasting job on such a huge undertaking.

1931—OVER THE MOUNTAINS—On the longest 26-in. gas line, laid over the mountains between Kettleman Hills and Los Angeles, Linde-welding set a record for fast daily production of sound welded joints.

1934—NEW SPEED RECORDS—At the Tulsa Oil Show this Spring, new speed records in welding were chalked up. With the Multi-Flame Lindewelding Head welds were made in 12-in. standard ¼-in wall pipe in 7½ to 8 minutes.

IN ACTION—Out in the field we see the Multi-Flame Lindewelding Head setting new records for fast production on pipe lines. Better, stronger welds in less time, less material and least cost.



● The question of new meters versus continued repair of old meters is not one of policy. It is simple economics. ● Like production cost per MCF and distribution cost per MCF, meters may profitably be placed on the same basis . . . meter cost per MCF or per meter year. ● Your own records will tell you whether good economics is on the side of modern American meters (with their higher capacity ranges and longer accurate life, employing the most advanced developments in design and materials) or on the side of higher operating cost for out-moded meters. ● American Meter Company will gladly cooperate with you in safeguarding the greatest possible return on your every meter dollar invested.

. . . also RELIANCE REGULATORS for close pressure control and positive lock-up.

AMERICAN METER COMPANY

Measurement and control of Gas, Oil, Steam, Air and Liquid

Meter Trade Names:
AMERICAN—D. McDONALD—METRIC—MARYLAND—PACIFIC—TUFTS

Albany Baltimore Birmingham Boston Chicago Dallas Denver Erie Kansas City
Los Angeles Philadelphia Pittsburgh New York San Francisco Tulsa

185

They Say . . . Opinions and Comments

IN A RECENT INTERVIEW with H. H. Cuthrell, New Business Manager of The Brooklyn Union Gas Company, he pointed out the necessity for thorough cooperation between manufacturer, dealer and gas company.

Read his words: "To achieve this *(cooperation)* much depends upon the gas company. Through its sales of gas and sales and service of gas appliances, it has a closer touch with the customer than either of the other two agents. It is in a position, whereby it may know what the customer needs and how to satisfy that need.

"The gas company can learn its potential market—the gas appliances its customers should have—through a thorough, efficient survey of its territory or the part of its territory that provides the best market for domestic gas appliances. It may also go further by learning what its individual customers seek in their household appliances.

"This information should be utilized by the manufacturer in his design of the appliances and in his advertising and promotional effort. Therein lies the contribution to three-fold cooperation due from the manufacturer. Guided by the knowledge and information that the utility has for its customers, the manufacturer should endeavor to produce a quality appliance to meet the customer's needs and pocketbook. He should then cooperate with the gas company in advertising and promotional effort to sell his appliances to the public. That effort should be guided by the knowledge the gas company has of the present market and not by out of date general methods.

"Continuing this cooperation to the third agent—the dealer—I firmly believe that the only manner in which our modern gas appliances can be merchandised properly is for gas companies to engage in and supervise gas appliance sales in cooperation with master plumbers and other reputable dealers.

"In this connection a problem arises from the manufacturer's standpoint. In the merchandising of appliances the gas company can only promote the products of a limited number of manufacturers. Gas companies must realize that if some other manufacturers of approved appliances want to merchandise their products within their territories, some means should be made available so that they will have a fair opportunity to get their share of the business.

"Such cooperation between manufacturers, dealers and gas companies will make for greater success in the three agents receiving a high percentage of the available business in their markets. Through such cooperation the dealer will be educated to sell only approved quality appliances and to meet the fierce competition of inferior appliances by aggressively selling quality appliances that surveys have indicated the customers want and that manufacturers and gas companies are cooperatively advertising and promoting."

IN THE MANUFACTURING field, T. S. Kennedy, Promotional Manager of Standard Gas Equipment Corporation of New York, has developed some interesting sales points, urging thought in terms of "selling possibilities, not merely manufacturing excellence." He believes that gas range prospects today fall into two groups: First, we find those definitely out to buy new ranges—actively shopping—with already some fixed ideas of VALUE.

Evidently these purchasers are the ones who have been influenced by Promotional Advertising resulting in creating their DESIRE TO BUY. Thus, they know about what to expect in a modern range; and about how much they want to pay for it.

Considering the other group, Mr. Kennedy says: "In it are those women who are not looking for new ranges—but who can be sold. They are making their old ranges do only because they do not realize how much more pleasant a new range will make their cooking hours, or because they have wrongly concluded that new ranges are too expensive even to think about just now."

In interesting the first group PRICE-PROMOTION seems to offer its only excuse for existence. But we believe that the smart merchandiser will merely capitalize upon the customer's original notions, if she happens to lean toward a low priced unit, and satisfy her by displaying the number. BUT, this opening parley should only serve as the springboard to elevate her choice to a DESIRE FOR THE BEST.

"It takes BIG NEWS—her own kind of news—not mere price, to arouse in her mind a discontent with her present cooking equipment," Mr. Kennedy resumes, in discussing the second group. And continues: "Her interest must be deliberately stimulated. Mere shouting of price, or mere listing of features will not do it. The new range must be dramatized in terms of what she might be enjoying in her kitchen if she had it."

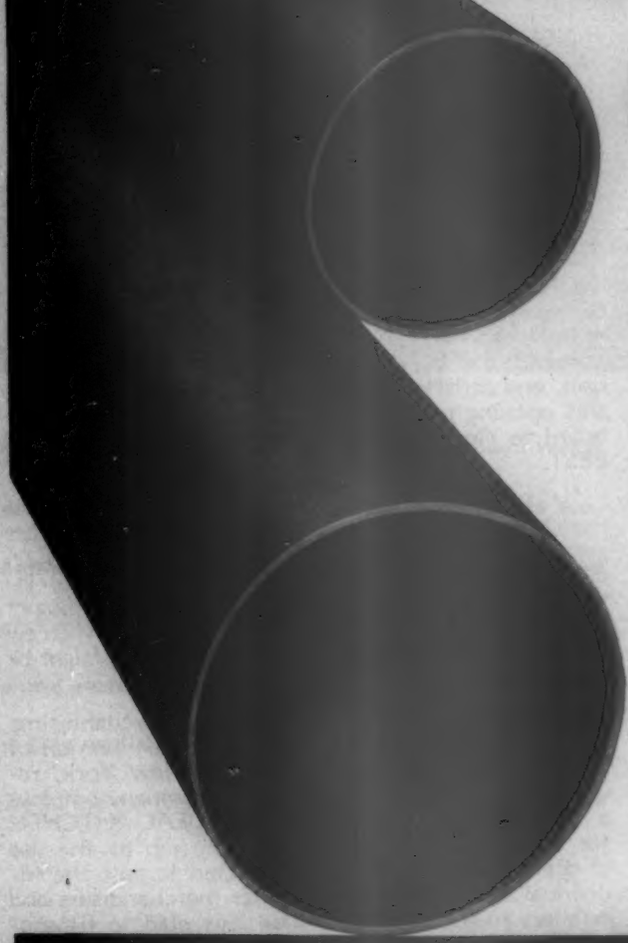
SPEAKING OF SHOWmanship in merchandising, N. T. Sellman, Director of Sales and Utilization of The Consolidated Gas Company of New York, reveals some useful practices. This Company employs a department to visualize the IDEAL KITCHEN for the prospect, accomplishing the job by the use of drawings and models constructed to suit the individual case. Of course smaller merchandisers and retailers might have to utilize this plan to fit specific situations, perhaps working the idea into an effective window display patterned after the layout of the average kitchen in their territory.

Since 90% of the section served by Consolidated is occupied by apartments, its situation is rather unusual. Naturally, much effort has to be put into Promotional Advertising which will create the URGE TO DEMAND; and

(Please turn to page 28)

ALL THESE ADVANTAGES ARE COMBINED ONLY IN STEEL GAS MAINS

and together they mean



RELIABILITY *to the highest degree*

No one quality or advantage but rather a combination of several must be incorporated in pipe for gas mains, if it is to meet the exacting demands of modern service. NATIONAL Steel Pipe has the qualities important for such use. Easy installation, low maintenance cost, long service, maximum safety, are provided when NATIONAL is specified.

High tensile strength and extraordinary ductility make NATIONAL steel mains reliable under vibration and shocks of traffic, cave-ins, trench pressures and settling of filled ground. Superior quality, adaptability to all types of joint, and fewer joints per mile speed up laying operations and on completion reduce interruptions of service to a minimum. All gas line pipe is tested and inspected to the rigid requirements of the A.P.I. specifications. Thus, true economy and satisfaction are obtained to the highest degree. For severe corrosive soil conditions, various coatings and linings are available. Questions concerning steel gas mains will be gladly answered by the engineering and technical departments of the largest manufacturer of tubular products in the world.

NATIONAL TUBE COMPANY, Pittsburgh, Pa.
Subsidiary of United States Steel Corporation

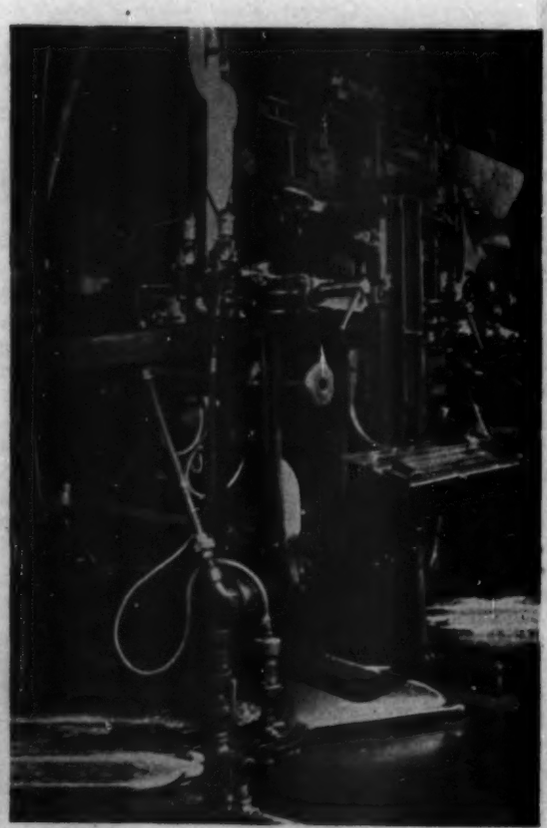
STEEL GAS MAINS

AMERICAN GAS JOURNAL
September, 1934

Protecting and Augmenting Commercial and Industrial Gas Business

This Well-Planned Campaign Maintained the Commercial and Industrial Load and Added Profitable Business to Companies' Mains

By E. V. BOWYER
Roanoke Gas Light Co., Roanoke, Va.



Immersion Gas Linotype Burners replacing Electric heating elements. Exhibit 6.

ROANOKE, Virginia, is a City of approximately 80,000 (17% negro), supplied with 525 B.t.u. coal gas through about 10,000 meters. Our competition in the commercial field consists of cheap coal at $3.75 to $6.50 per ton, oil from 3c to 9c per gallon and electricity from 9 mills to 1.5c per Kwh. For three years our commercial and industrial load has been on the decline, there being a 12.4% loss in yearly sendout for 1933 compared with 1932. After a close study of the problems involved decision was made to: (1) File a more promotional rate; (2) Inspect, clean, adjust and otherwise service existing installations; (3) Set up proper means for periodic service for present and future users; (4) Replace old equipment then on our lines where possible; (5) Add new load. It is important to note that 90% of the commercial gas used in Roanoke was in cooking establishments, there being very little outlet for industrial purposes.

The following Commercial and Industrial rate was put into effect:

First, 25,000 cu. ft., minimum bill	$25.00
Next 125,000 cu. ft.	.60 per Mcf.
All over 150,000 cu. ft.,	.45 per Mcf.

Although the minimum bill was raised the 60c step in the rate outlined above was a slight reduction over the old Commercial and Industrial Rate, whereas the 45c step was a very substantial reduction to compete more effectively with cheap oil and coal.

The next step in the program was to provide all commercial users with a free periodic inspection, cleaning

ROANOKE GAS LIGHT COMPANY
ROANOKE, VIRGINIA

COMMERCIAL AND INDUSTRIAL APPLIANCE SERVICE RECORD

Name .....Address.....
Hours for Service .....Ask for.....
or.....
List of all gas burning items by manufacturer's name and number
.....
.....
.....
.....
.....
.....
.....
.....

Commercial and Industrial Service Record Card of all gas appliances which is kept up-to-date by service mechanic and sales department

Exhibit No. 1

and adjustment service as needed in accordance with exhibits 1, 2 and 3. A competent, well-trained man was selected to do this work, the service records and reports being kept by the service department clerk. The results have demonstrated definitely that before replacement equipment could be sold, or new load added, that the first essential was to put existing installations in first class shape within the limitation of such appliances.

Gas pressure variations with attendant fluctuation in B.t.u. input, especially where closed-top ranges or automatic equipment was employed, often had caused flash-backs in the burner mixer and crystallization of burner parts—hence, service complaints, high gas bills and dissatisfied users. To overcome this condition after cleaning, an appliance regulator was installed to overcome variable conditions that permitted permanently proper burner adjustment. This, of course, meant a re-reduction in customers' gas bills, but resulted in eliminating the majority of complaints. By first protecting our present load through adequate service and pressure regulation, a firm foundation was established on which to start adding new load and revenue. Experience in Roanoke substantiated the observation frequently made that the gas industry generally speaking, have been prone to accept existing and future commercial revenue for granted due to the assumption that service conditions are adequate.

The next step in the program was to set up various types of saleable up-to-date commercial equipment connected to gas as a live demonstration. A very complete file of present consumer appliances, yearly gas consumption tabulation per customer and a complete equipment catalogue file, was set up to enable the handling of any request promptly, thereby creating the utmost confidence in the prospect's mind. A personal call was made advising and emphasizing to our users and prospective customers of our new rates, service and modern display of commercial gas equipment.

To our surprise, our customer had manifested for years an indifference to come to us of their own volition with their problems of equipment, high bill complaints, unsatisfactory service, etc., the result being a gradual reversion back to coal and oil. Later a mail campaign was put on to illustrate modern, heavy-duty cooking, baking, space heating, refrigeration and water heating. Following this, a Cooking and Baking Show was staged, led by a prominent local chef. The stimulant of this visual demonstration started a current of thinking, talking and buying new, modern gas equipment. The entire process furnished added proof to the adage that selling is thirty-six times easier through the eye than through the ear.

The following is a summary of the results achieved as varied by actual meter route sheet checking:

SUMMARY OF SIX MONTHS' COMMERCIAL CAMPAIGN RESULTS

	Yearly Mcf.	Merchandise Valve
Present load Protected by Sale of New Equipment at no Gas Saving:		
Commercial	7,430	$3,800
Industrial	2,120	1,250
Total Old Load Protected by Sales of Modern Equipment (21% of 1933 Commercial Load)	9,550	$5,050

ROANOKE GAS LIGHT COMPANY
ROANOKE, VIRGINIA

APPLIANCE SERVICE REPORT

Name .....Address .....

Date .....All our gas burning appliances were cleaned, adjusted, and inspected by your service representative and are operating to our satisfaction.

Signed .....

By .....

Customer's signed receipt is turned in by service mechanic for posting on service record.

Exhibit No. 3

	Per Cent of Total Yearly Sendout	Yearly in Mcf.
Customers' Savings by Cleaning and Servicing Old Equipment..	3%	1,359
Customers' Savings by Replacing Old Equipment with New.	4%	1,812
Total Yearly Savings to Customers	7%	3,171

	Yearly Mcf.	Merchandise Value
New Added Net Load		
Commercial ...	14,261	$11,500
Industrial	3,330	3,800
Total New Added Net Load	17,591	$15,300

	Yearly Mcf.
Total Added New Load.....	17,591
Less Customers' Savings....	3,171
Total Net Added New Load (32% of 1933 Commercial Load)	14,420

The rate revision mentioned above was calculated to reduce commercial and industrial revenues to the extent of 19.6% but due to the program conceived in and carried out over the last six months' period the rate loss has been not only overcome but revenues of last month indicate that the corresponding month of the previous year was exceeded by 7.3%. To this should be added the immeasurable benefits of: (1) Retention of load that otherwise would have been lost; (2) Improved public relations; and (3) A considerable number of domestic sales arising therefrom.

Of the new net added load the following classification is made:

Commercial	Major Installations	Net Add. Yearly Mcf.
Cooking	18	8,640
Automatic Water Heating	45	2,250
Volume Water Heating 3,000 gal. per day	1	2,200
Space Heating	4	800
Baking	3	250
Refrigeration	3	121
		14,261

The equipment required to obtain the above added yearly load represented a re-sale value of $11,500.

CLEANING, ADJUSTMENT AND INSPECTION SERVICE

Date.....	Date	Date	Date .....
Date.....	Date	Date	Date .....
Date.....	Date	Date	Date .....
Date.....	Date	Date	Date .....
Date.....	Date	Date	Date .....
Date.....	Date	Date	Date .....
Date.....	Date	Date	Date .....
Date.....	Date	Date	Date .....
Date.....	Date	Date	Date .....
Date.....	Date	Date	Date .....
Date.....	Dtae	Date	Date .....

Service dates are posted from signed service reports turned in by service cards.

Exhibit No. 2

Industrial	Net Added Yearly Mcf.
Newspaper	210
Candy Co.	1,240
Pressing Clubs	1,080
Miscellaneous	800
Total	3,330

Modern gas equipment required to obtain the above added yearly load represented a re-sale value of $3,800 some of which was purchased directly from the manufacturer through arrangements with our Company.

Modernized cooking equipment to protect present load as covered by Exhibit No. 4 was installed in the Roanoke Hospital to provide better and more economically cooked food for this 110-bed institution. Also a large Barnstead gas-heated still and other miscellaneous gas equipment has been put in to replace old, obsolete items.

All of the old-style, externally-fired, manually controlled remelt and stereotype pots at the local newspaper plant have been converted to Kemp Automatic Immersion gas heat as covered by Exhibit No. 5, to protect present load.

The electrically heated Mergenthaler linotype pots at the same plant have been converted to Kemp Immersion gas-heated Automatic Units as shown in Exhibit No. 6. This installation is the first of its kind to be installed on a linotype machine and was developed at our special request through cooperation with C. M.

Modernized Cooking Installation at Roanoke Hospital. Exhibit 4.

Coke-fired Candy Furnaces converted to gas including 40 gal. Automatic Gas Water Heater and 2 h.p. Gas Steam Boilers in New Plant. Exhibit 8.

Kemp Mfg. Co., Baltimore, Md. These immersion burners promise to revolutionize the heating of linotype pots as they reduce dross, they are faster, fully automatic, exacting in temperature, will last indefinitely and are free from service, not mentioning the fact that they are 66 2/3% cheaper to operate on 525 B.t.u. gas at 60c per 1,000 cu.ft., than electricity at 1.5c per kwh.

We discovered that most heavy-duty gas broilers were out of service or that our customers were employing a cheaper method of cooking such foods by frying them on griddle-top equipment.

We have put back into service some of these broilers by changing the present grids so as to broil both sides of such foods at the same time. This has meant 50% to 60% reduction in gas fuel cost and 50% reduction in broiling time. This enables our customers to turn out better and more tasty broiled food at a cost which is in keeping with the volume of profit on such sales.

Gas-heated hair dryers, gas-heated smoke houses, high-pressure gas steam boilers for pressing clubs, gas-fired bench furnaces, gas-heated solution tanks, gas-heated pressure cookers, etc., have been put into service as a result of this six months' campaign.

We understand that the volume water heating installation as shown in Exhibit No. 7 is the largest installation of its kind in the South on manufactured gas. This installation furnishes 3,000 gallons of 145 degrees water daily for the local branch of the S & W Cafeteria. The 600-gallon storage tank is heated by a #6-W-43 Bryant Automatic Gas Boiler. This replaced a Kewanee Boiler fired by an iron fireman and slack coal at $3.75 per ton, f.o.b. bins. This cafeteria also uses gas throughout for cooking, baking, frying, steaming, broiling, etc.

The new home of the Martha Washington Candy Co. was added during the campaign as covered by Exhibit No. 8, protecting our present load of 200,000 cu.ft. and adding 1,240,000 cu.ft. yearly.

It's interesting to note that to date there has not been a single repossession of equipment as a result of this campaign and the reaction has been most unusually favorable, influencing scores of our commercial and industrial customers to extend a greater use of gas in their business as well as adding many new ones.

7,500 lb. S Stereotype Pot converted from External Gas Heat to Immersion Gas Heat. Exhibit 5.

3,000 gallons of 145° supplied daily by a gas Boiler replacing Coal. Exhibit 7

Building the Househeating Load—Part III

Knowledge of Proper Method of Installing Heating Systems, Pressure Regulation, Preliminary Inspection for Conversion Jobs and Permanent Records of the Consumption and Fuel Costs, Important in Attaining This Much Desired Load

By CARL B. WYCKOFF

Househeating Dept., Public Service Co. of Colo., Denver, Colo.

THE heating plant should be installed in as central a position as possible to avoid long runs, especially with warm-air plants. However, this is something over which one frequently has very little control. The installation, when new, is made to conform with the National Standard Code. The space between the top of the heating unit and the bottom of the joists should be at least 15 inches. In the event this amount of space is not available, there will have to be a pit provided. Some installations are made with a pit just large enough to accommodate the furnace, but a better practice is to make the pit of sufficient diameter to allow a workable clearance all around the plant. Pits also have to be resorted to sometimes in providing a pitch for the warm-air leaders, especially where they are long.

Gas Pressure Maintained

The gas distribution system should carry sufficient pressure at all times to insure an unfluctuating pressure at the inlet of the househeating burner. This is most important as gas cannot be utilized to the best advantage with a varying pressure.

Where residence or house governors are installed at all meters, this presents no problem, but, unfortunately, there are a great many low-pressure systems where there are no such regulators and the consequent result is an uneven pressure, varying considerably at times. In these instances, a governor should be installed at the inlet of the househeating burner and this governor should be set with an outlet pressure somewhat lower, at least one inch, than the normal pressure existing at the outlet of the meter. This will provide a constant pressure at the burner irrespective of the fluctuations in the house piping lines. Naturally, the pressure at the burner should be maintained at a point that will produce the proper inspirating effect and thus entrain a sufficient amount of air.

The supply line from the meter to the house-heating burner must be independent of all other lines as the demand is commonly high and when the thermostat turns the burner on it might be possible to extinguish the pilot lights on other equipment if all the appliances were connected to the same line from the meter.

The size of the supply line will naturally depend upon the length of the run and the amount of gas to be supplied per hour. There is no advantage to be gained by unnecessary expense incurred in installing lines larger than required. The same rule applies to meters. A number of companies insist that the piping be not less than 1¼ inches and that a large meter be installed. This entails considerable additional expense when it is considered that in quite a number of instances a ¾-inch pipe

Make	Size	Capacity			Dimensions			
		½" Diff.	1" Diff.	2" Diff.	Height	Width	Depth	C to C Screws
Maryland	5 Lt. St.	115	160		16⅛		9 15/16	11¼
Maryland	5 Lt. B.	160	230		16⅛		9 15/16	11¼
Metric	5 Lt. B.	160	230		14	8¾	10	6
Sprague	1-A	160	230		13¾	9½	8	6
Ironclad	1	160	230					
Maryland	20Lt.St.	250	350		21¾		13	15⅝
Metric	10 Lt.B.	300	400		15⅛	10	10¼	6⅞
Maryland	10 Lt.B.	300	400		18½		10½	13⅜
Emco	2	350	500	600	16¾	13	10¾	8
Metric	20 Lt.B.	400	550	700	17¾	12¼	12½	8¼
Sprague	3	400	550		17	12	10	6¾
Maryland	20 Lt.B.	400	550		21¾		13	15⅝
Maryland	30 Lt.B.	600	850		26⅛		15	18 15/16
Metric	30 Lt.B.	600	850	1200	22	16	15¼	11

Meter Capacities and Dimensions.

is ample and that the regular five-light meter will handle the load.

Conversions

Where the installation is to be a conversion job, a thorough inspection must be made to ascertain the condition of the heating plant. After cleaning out the usual accumulations in the fire box and wire brushing, chipping or scraping off all adhering clinkers, rust or soot, one can readily see any bad cracks that may be in the fire bowl. There are frequently, however, small cracks and often the cement between the castings has cracked or disintegrated and these latter conditions are not easily recognized. Of course, where the walls around the warm-air registers are smoked up it is apparent that there is a leak in the combustion chamber. Still, this may not always be the case, for in instances where the register casing does not fit closely against the wall, part of the circulating air passes out through this crack between the casing and the wall. This air flowing along the wall deposits thereon the dust that is always present in unwashed air. After extended periods of operation this dust deposit will have nearly the same appearance as coal soot. This condition is aggravated if the return air pipes are located near the kitchen, where grease from the cooking will increase the tendency of the air-borne dust to adhere to the walls.

It, therefore, follows that, to be safe, one must make a test that is sure. A good many place an electric light globe in the fire box and then disconnect one of the warm-air pipes. In the event of a leak the light will shine through. This is a good test, but the smoke test is the only sure one, and it should be used exclusively. In this test the registers throughout the house are closed and the fume pipe is stopped. A warm-air pipe is disconnected from the furnace and a smudge produced in the fire box. This smudge can be from an oily rag or something similar. It will require only a small amount of smoke, which can be readily vented from the basement when the test is completed. Of course, if there is a leak the smoke will come out of the warm-air pipe connection. Water should not be used as it is a solvent for numerous furnace cements. Should any leaks be detected, of course, the conversion cannot be installed until the defect has been corrected.

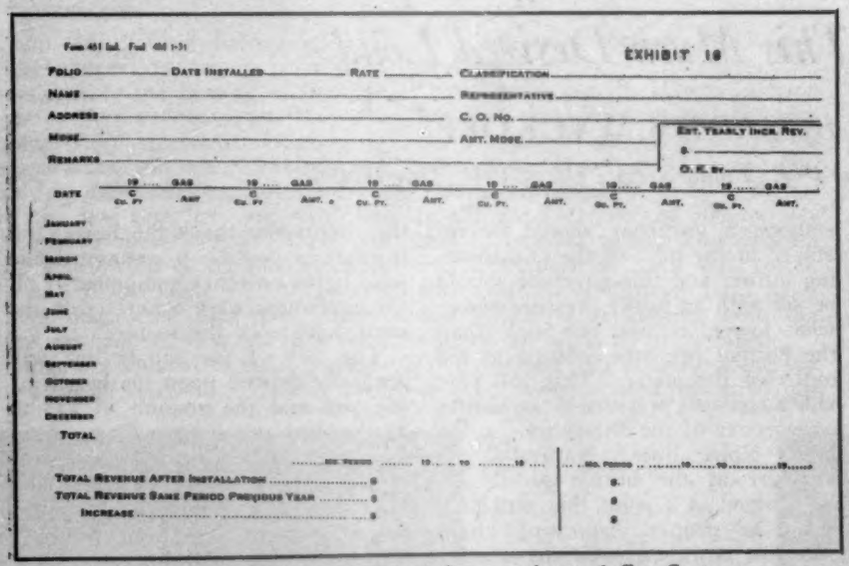


EXHIBIT 18

FOLIO ____ DATE INSTALLED ____ RATE ____ CLASSIFICATION ____

NAME ____ REPRESENTATIVE ____

ADDRESS ____ C. O. NO. ____

MODE ____ AMT. MODE ____ EST. YEARLY INCR. REV. $ ____

REMARKS ____ O. K. BY ____

DATE	19.. GAS C Cu. Ft.	AMT.	19.. GAS C Cu. Ft.	AMT.	19.. GAS C Cu. Ft.	AMT.	19.. GAS C Cu. Ft.	AMT.	19.. GAS C Cu. Ft.	AMT.	19.. GAS C Cu. Ft.	AMT.
JANUARY												
FEBRUARY												
MARCH												
APRIL												
MAY												
JUNE												
JULY												
AUGUST												
SEPTEMBER												
OCTOBER												
NOVEMBER												
DECEMBER												
TOTAL												

	..... MO. PERIOD ..... 19.. TO ..... 19..	..... MO. PERIOD ..... 19..... TO ..... 19.....
TOTAL REVENUE AFTER INSTALLATION	$	$
TOTAL REVENUE SAME PERIOD PREVIOUS YEAR	$	$
INCREASE	$	$

Complete Record of Actual Consumption and Gas Costs.

In connecting the fume pipe to the chimney the connection should be as high above the bottom of the flue as convenient. Where the space is limited the house-heating connection should be below the others. This is to anticipate flue stoppages. The house-heating connection being the larger would not stop completely as readily as, for instance, a three-inch vent on a water heater. Further, it is necessary in all cases to provide a clean-out hole at a low point in the flue. This should be as low as possible, certainly below the level of all fume pipes, and should be readily accessible.

This clean-out should be watched closely and the customer should be instructed to inspect it and clean out any accumulations at least once a week, particularly for the first year. Of course, in the more newly constructed homes numerous cities require a flue lining which will eliminate much of this hazard. In the older houses there is very apt to be a collection of soot deposited throughout the chimney. Also, there is usually a certain amount of mortar protruding on the inside between the bricks where they have been pushed down and the inside of the joint not pointed up.

In the combustion of any fuel, whether solid, liquid, or gas, there is considerable moisture passing up through the chimney, and the amount will not vary appreciably per given number of B.t.u. in the different types of fuels. However, gas is generally burned more efficiently than other fuels, thus resulting in a lower stack temperature and more condensation.

Any material like soot or mortar is subject to becoming water-logged to a point where its own weight dislodges it, and it could fall to the bottom of the flue, thus stopping off the connecting vents. This condition is rarely such that all the material drops at once, but it does break off in pieces, so a periodical inspection and cleaning will eliminate this hazard.

Such jobs should be inspected from time to time as it is possible for a poorly built chimney to disintegrate to such an extent as to become, in some cases, badly discolored on the outside and even to materially affect the draft. This condition will appear first at some point in the exposed part of the chimney as the products of combustion are then apt to be cooled to the dew point from the contact of the outside of the chimney with the outside air.

It is also possible for such conditions to cause a discoloration of the wall paper and in severe cases even for the plaster to loosen. This latter condition frequently makes itself known by a peculiar odor in the house, particularly should the chimney pass near a closet or room that is poorly ventilated. This odor slightly resembles formaldehyde.

In any of the above cases where chimneys are defective they will have to be lined with some suitable material. With such linings the entire chimney must be lined from top to bottom, and each vent connected to the lining with a gas-tight joint. The lining should be of ample size to ven. all appliances connected to it and should be continued down below the bottom vent pipe to the clean-out hole.

Most chimneys are all right and experience has proven that only a small number cause trouble. Therefore, it would be unreasonable to insist that they all be lined.

Gas and Air Flows and Adjustments

All orifices should be of the fixed or drilled type. The size of the opening will depend on the input rating of each individual piece of apparatus, with the exception of the househeating burner, in which case the volume of gas is predetermined by the maximum heating requirement. There are some orifices that are constructed so that the opening is circular, but can be expanded or contracted so as to produce the desired results. These orifices are satisfactory unless the demand is large enough to permit gas to pass through in other places than the center opening. The gas should come through a center unrestricted opening to secure the proper inspiration and entrainment of air.

Another feature of the fixed orifice is that it eliminates tampering and assures a constant condition. The flow of gas required is furnished by the househeating engineer, who makes the individual survey, and the installer drills the orifice with the proper size drill.

Pilot lights should also have a fixed orifice so when in operation the valve will always be turned on full. This eliminates guesswork as to how high it should be turned. Of course, the tip is made of such material that it will not easily fuse or corrode.

Air adjustments with natural gas conversion burners should be such as to carry approximately 30% excess air, which is represented on the Orsat test by 9% CO_2 and 5.2% O_2 With gas-designed equipment this amount can be lowered some, and also these figures will vary somewhat with different compositions of gases. This excess air is necessary, due to changes in atmospheric conditions and to insure complete combustion. The air shutters can be opened to a position where the flames begin to leave the burner ports and then closed slowly back until the flame does not leave the burner. There should be no yellow in the flame. However, there is a great deal of difference between yellow and orange and at times there will be a tinge of the latter color, especially when the refractories become heated up, which changes conditions slightly from those existing at a cold start.

EXHIBIT 19

City & State ..... 19 ....

This supplement agreement for the purpose of thermostat and gas burner (original agreement attached) is between the undersigned called "Customer" and ....., called "Company."

It is agreed that, if this heating equipment proves unsatisfactory and customer desires to have it removed, customer shall notify Company in writing within ..... months from date of installation.

The Company will remove said equipment as specified above, which then becomes its property, provided all monthly gas bills and installments to date are paid. The Company agrees to make final settlement on the return of said equipment by crediting Customer's account with the then unpaid balance of the original purchase price, up to but not exceeding the amount of .. BLANK DOLLARS ..

Blank Company **Customer:.....**

Address:.....

By: ..... **Bill to:.....**

Agreement whereby customer may dissolve contract at his option. (Used with conversions and circulating heaters on special drives only.)

EXHIBIT 22

HOUSE HEATING INSTRUCTION REPORT
COMPANY

NAME .....

ADDRESS .....

TYPE OF INSTALLATION .....

I have received instruction about the operation of my gas-fired house-heating installation and have read the Instruction Card, a copy of which is posted near my heating equipment.

I have read carefully the instructions regarding the attention to be given to the pilot light and to the chimney, and understand that it is my responsibility to follow these directions.

Signed .....

Date .....

The customer was shown how to operate the heating installation, read the Instruction Card and in my presence signed this acknowledgment of receiving instruction on the above date.

.....

Company .....

Releases, to be used after inspection and instruction.

Installation of Burner

The burner is generally placed in the ash pan, the door having been removed and all openings tightly cemented so as to eliminate any air leakage. The location of the burner as to elevation will depend upon the type of the heating plant. Naturally, the heat should be applied at a point just above the top of the air return or the water return on a boiler job. Otherwise it would retard the circulation. There is much to learn about the installation of equipment, especially when one considers the numerous accessories that go with a good househeating job. One embarking on such an activity, if not entirely familiar himself with this line of work, would do well to borrow the services of some one who is well experienced to help him get lined up. In the case of the actual change over to a higher grade of gas, one should by all means arrange to get some well-experienced person to direct the work, and also to borrow as many men as possible to assist. The expense incurred will be negligible with the trouble that can be avoided.

Records

It has been found very valuable for the shop and service department to have an individual envelope record system wherein a duplicate copy of the original installation order, together with all service calls, etc., thus compiling a complete history of the

(Continued on page 36)

Vertical cylindrical high pressure storage tanks, 50' in diameter and 100' overall height. Fixed ladders with rail top of cylindrical section for hanging maintenance platforms. In warmer climates controls are placed in open as in lower left hand corner. (Fig. 14.)

High Pressure Storage*

Design of Manholes, Joints, End Plates, and Connections of Storage Tanks. Description of Sphere and Cylindrical Types

By DISTRIBUTION ENGINEER

ALL the designing necessary on the steel work of storage tanks such as joints, end-plates, connection, manholes, etc., is usually done by the concern fabricating and, in most instances erecting the steel work. However, it is good practice to specify certain features which experience has determined as good practice.

Two types of manholes are in general use, one being the raised type projecting outside of the holder shell and having a flanged joint and the other the boiler type in which the gas joint occurs inside of the shell. For gas work the flange type has proved much more satisfactory than the boiler type as should any shrinkage of the gasket material occur because of the dryness of the gas it is a simple matter to tighten flange bolts. In the flange type there are numerous small bolts around the periphery of the flange providing a simple method to secure a uniform and high compression of the gasket. On boiler types there is usually only one or two saddles for securing the necessary pressure to seal the joint. Saddles are more awkward to install and difficult to tighten so as to evenly distribute pressure around the gasket. The boiler type usually has a narrower width gasket which is more difficult to center in the oblong opening and more difficult to observe when installing than the flange type gasket. Where a boiler type manhole occurs on the top of a tank, as is usually the case on small capacity storage, water can pond in the depression caused by the method of construction and from intermittent saturation, freezing and thawing the gasket may lose its effectiveness. The removable section of the boiler type is usually a heavy section of cast material on which it is difficult to secure or keep an even, smooth surface which is necessary to obtain permanently tight joints with the ordinary types of gasket material. The most successful type of gasket for gas on the boiler type of manhole is one of a rubber composition which will resist the action of drip oils and by proving an extra wide gasket the effect of eccentricity is minimized.

Welding Seams

Welded seams are a new departure in the larger sized storage tanks. Recent development of construction methods have made welded seams practical on all size tanks. Regardless of the care taken during construction and testing, leakage gradually developes on riveted seams of all types particularly around rivets. The repair of such leaks is ditficult, expensive and often not permanent. Paint-

** Continued from August issue*

ing is affected by the leaks and streaks of oil often detract from appearances even though actual gas leakage does not occur. Welding seams both inside and out practically eliminates these difficulties. Welding was not used on larger sized storage tanks in the past due to the difficulties encountered in erection but these have been overcome to the extent that little if any difference in investment is necessary to secure the more advantageous welded tanks.

The idea that riveted tanks may be easily dismantled and the location changed is not economically sound as dismantling, shipping and re-assembling usually costs more than the total investment of a new storage tank. This fact is naturally only true when a tank must be totally disassembled as moving a small tank as a unit is common practice and easily accomplished.

A ladder with a removable bottom section which can be kept in an inaccessible place or locked to a solid object nearby when not in use enhances safety. Even where a fence surrounds the storage nonemployees often gain access to a holder and from accident statistics appear particularly fond of climbing ladders. The safety practice of removing the bottom section of the ladder also prevents unauthorized employees from subjecting themselves to undue hazard by climbing the storage tank.

Permanent Ladder

Ladders are sometimes provided with a swivel connection at the top of the tank and with wheels to allow moving the ladder as an aid during repairs, inspection and painting. A ladder is more often a handicap than an aid to repairmen or painters as it is awkward for use as a workman's platform. The wheels on a movable ladder even though wide, cut into the steel slightly and destroy the paint. A permanent ladder location near the inlet pipe riser, when the riser is any place but at the bottom, has the advantage of providing easy access for repair, testing and painting to the riser and the valve located at the connection. The ladder should be placed close to the holder shell and the riser at a sufficient distance out from the tank so that it is not necessary to reach through or around the ladder to reach the riser for repair or maintenance functions. A rigidly fastened ladder is safer than a movable one as the swaying of a movable ladder during use often confuses a workman. The riser connection or valve is most convenient when on the side of the ladder which will allow the right hand to be nearest the equipment.

Placing the ladder and connection where they will be exposed to the sun during the greater part of the day will keep them as free as possible from ice during the winter in northern climates and in all climates largely eliminates moisture which tends to collect and cause slipperiness.

On the sphere type of holders it is more convenient to accomplish repair and maintenance work from boatswain's chairs or platforms than from a movable ladder.

A permanently located ladder allows for providing safety rings through which one must pass when climbing and which prevents falling should the hand slip off the rungs.

High pressure storage with raised type manhole located about eight feet above ground level. (Fig. 7)

Safety Valves

Practically all storage, being classified as an unheated pressure vessel, is required by insurance codes or state ordinances to have a safety valve. The safety valves are usually placed on top of the storage and are usually in duplicate particularly on larger sizes. Placing gate or plug valves between the storage and the blow off valves is usually prohibited but three-way valves may be secured with the ports so arranged that it would be impossible to close off both safety valves on any one tank at any time although either may be individually shut off for repair or inspection. Most companies consider the installation of a three-way shut off valve previous to the two safety valves an unnecessary expenditure but the periodic operation of the safety valves is recommended as a test of their workability and this practice may result in foreign matter lodging on the safety valve seats necessitating dismantling for cleaning or repair.

The safety valve outlet should be protected from snow and rain by installing a street ell or elbow facing down. The open end of the street ell should be screened to exclude birds and large insects. Safety

Boiler type manhole on top of small tanks. Note how water collects and freezes. Gasket partly protected by partial filling of depression with inhibitive type greases. (Fig. 8)

Oil leaks along seams and around rivets of high pressure storage on manufactured gas. Seams and rivets thoroughly tested after erection of tank. (Fig. 9)

valves of the smaller size up to two-inch connections may be obtained with a hood designed for snow and rain protection.

The manhole location is of more importance to the construction crew than for maintenance or operation. Erection framework and scaffolds are mostly placed inside of the tank and removed through the manhole or plates purposely left off near the bottom. Accessibility of a manhole for occasionally testing for leaks around the flanges requires a location easily reached from the ground.

The connection to the distribution or transmission system may be located any desirable place with no particular operating maintenance or economical advantages of side over bottom connections except for shortening the connection length or for convenient location of the connecting line due to obstructions. When connections are run overhead through the storage yard the flange for connecting should be at the same level or slightly higher to prevent traps. To avoid 90 degree bends some prefer to bring the connecting line to the storage at an angle of 45 degrees with the horizontal. Avoiding 90 degree bends is unnecessary when considering pressure losses due to friction as the rate of gas flow to or from the storage is insufficient to produce a large pressure drop. When cylindrical tanks are installed vertically it is usual to have the connection at or near the bottom to avoid damage caused by swaying of the tanks. The bottom connection is the most commonly used location and experience has found it to be satisfactory except where material settlement of the foundation may occur.

A bottom connection is sometimes objected to because foreign matter, commonly resulting from scaling and corrosion of the internal storage surface, will accumulate in the outlet line. Considering the total quantities of gas used from storage the slight amount of such foreign matter would result in comparatively little harm to governors and other equipment and mostly immediately follows installation of the tanks. Foreign matter carried into storage from transmission lines is another problem and if acute there would be an advantage to the connection being located considerably above the bottom and a blow down connection provided on the bottom of the storage tank.

Drainage

At any location where condensate might collect in used or unused connections a small drain should be installed at the low point of the connection and carried preferably to a drip buried beneath the frost line. Draining of any traps applies in warm climates as well as sections subject to frost as the accumulated liquid may be highly corrosive. Precautions of this nature minimize the draining of storage for repairs, and save the high cost of removing and purging the storage.

The drains from various low points on the storage should have cocks installed as near the holder as possible to permit shutting off of these drain lines for repairs or changes in connections.

In warmer climates some concerns have used a water displacement type of high pressure holder to increase the available storage or to provide a constant pressure. The method of operation is usually through a gas pressure decrease controlled water valve which admits additional water into the storage as the pressure decreases and vice versa a valve which allows water to drain out as the pressure increases. Such a method requires when a single tank is used large amounts of water and often pumps to provide water under proper pressure or two tanks of equal size one of which is used for water storage, when water is forced out of the gas tank. Water displacement types of storage are limited to approximately thirty pounds pressure above which costs become excessive. A natural or artificial reservoir if at a sufficient elevation above the gas storage tank may be used as a water supply and overflow.

The available gas quantity in water displacement storage is a maximum possible in any type being the quantity stored between the maximum pressure carried and atmospheric plus practically the cubical contents. Such a large available storage does not necessarily result in low costs per unit of storage as the initial investment costs are usually considerably in excess of the dry types. Operating costs would exceed that on dry types due to the added factor of

Movable ladder construction on sphere. Note paint scraped off by rollers. Plate around blow off connection provides hinge. Note arrangement of nipple and elbow on safety valves to prevent rain getting into the interior of the valves. (Fig. 10)

water and gas controls together with the handling and corrosiveness of water.

By restricting the available storage to the amount which can be secured at the pressure of the maximum hydraulic head possible with any particular design advantage may be taken of the comparatively uniform pressure. Referring to illustration No. 13, H is the pressure in the storage when the water level in the reservoir is at its highest point and the holder tank contains no water. The maximum storage pressure without controls may also be stated as the pressure equivalent to a hydraulic head of water having a height H or from the maximum elevation the reservoir water attains to practically the bottom of the storage tank. Usually the water level in a reservoir especially if of natural origin is not affected by the quantity of water required to fill the gas storage tank. If h is the feet of vertical differential in water levels in the gas storage tank the difference in pressure due to the change in water levels with a large water storage reservoir would be that equivalent to a column of water of height h. With a tank or group of tanks installed at the same level and 10 feet in diameter installed horizontally the difference in outlet pressure of the gas would be approximately 4¼ pounds under practical working conditions. The disadvantages of even 4¼ pound differential would be that the lower pressure in the storage would occur when the distribution system was also low. Also when all available storage had been used there would be a sudden cutting off of the supply from the storage whereas with dry type storage there would be additional gas available at a sufficient pressure to supply a considerable number of consumers if not all for a period which may be sufficient to overcome temporary troubles.

Controls for Uniform Pressure

By supplying proper controls on the water inlet and outlet the gas pressure in the storage may be of any value up to the maximum for which the holder is designed or the maximum carried on the transmission line. With such conditions controls are usually installed on the gas outlet to provide a uniform pressure on the distribution system. Where a saturated gas is advantageous, hydraulic storage would provide a moistened gas at storage pressures. A safety factor provided by hydraulic storage is that purging may be accomplished without any danger or loss of gas.

Due to higher installation, maintenance and operating costs, only a few hydraulic type gas holders have been erected and then under particular conditions warranting the extra investment.

Sphere or Cylindrical Tank Types

There are two general types of high pressure holders designated by their shape. As the name suggests spheres are true spherical structures. Tanks are cylinders with rounded or spherical ends.

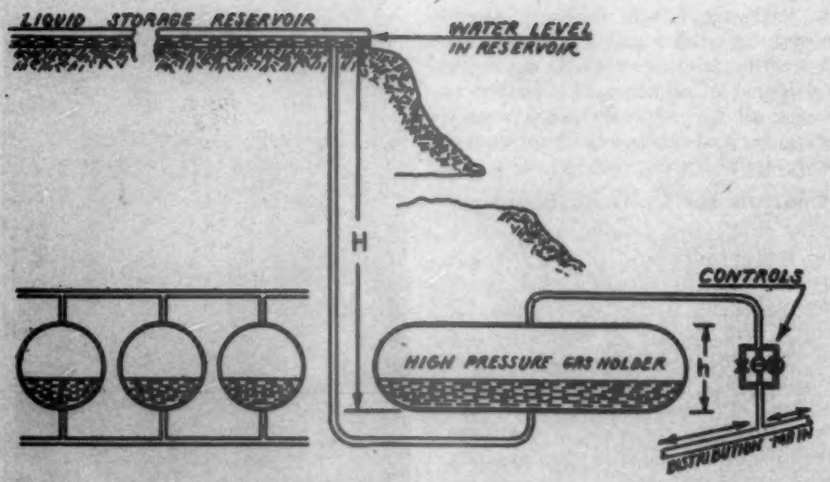
Historically tanks have been used for gas storage over a much longer period of time than spheres and there is less restriction in their economical size than in spheres. A common size for gas storage installations has been tanks of ten foot diameter by 22 feet long containing approximately 2250 cu. ft. cubical contents. While such tanks are ordinarily designed for the maximum transmission pressure generally encountered which on manufactured gas seldom exceeds 60 pounds, installations have been made for 150 pounds pressure.

Connections to small high pressure storage tanks. Slip coupling at ground level provides flexibility in addition to that furnished by swing joints on top. Plug valve on each riser. Tanks have paint partly removed. (Fig. 11)

Advantages result from securing tanks fully mill constructed and shipped as a unit when size permits. Complete mill construction limits the maximum size to approximately 10 feet diameter and 65 feet in length containing 4900 cu. ft. cubical contents, as that is practically the largest size which can be placed on two flat railroad cars. An advantage of mill construction is securing more permanently leakproof riveted joints than can be produced under field conditions.

While less difference is encountered between mill and field welded tanks the better conditions offered in a shop result in a more uniform welding, higher grade of supervision and on the average more capable inspection. Welded spheres of small cubical contents but for pressures higher than ordinarily used have been constructed but only on an experimental basis. Complete welded large diameter spheres have been constructed and

High pressure storage connections. Plug valve adjacent to storage. Drain lines from unused connections into connecting line are provided with plug cocks to facilitate repairs. Center connection has welded reducer to eliminate additional screw joints or flanges. (Fig. 12)



Diagrammatic sketch of water displacement type high pressure holder. (Fig. 13)

rapid progress may be expected especially in lowering investment costs as more are erected.

Variety of Sizes

Field erected cylindrical tanks may be secured in almost any variety of sizes. The most economical size, where large quantities are desired, has usually been found to be in units not exceeding 100,000 cu. ft. cubical contents. Such a tank if 40 feet in diameter must be 80 feet in length and ordinarily would be designed for maximum pressures of 60-75 lbs. The difference in costs in various locations between the tank and sphere types warrants considerable study on the sizes and types of storage to be used.

Large gas storage tanks are frequently erected with the long axis in a vertical direction to conserve both ground space and foundations. Conserving ground space can not always be claimed as an important advantage as in the majority of high pressure storage locations land is seldom valuable. Small cylindrical tanks erected horizontally have been installed one above another. When more than two are placed one above the other precautions against swaying are necessary.

For equivalent amounts of storage tanks frequently require more foundations than spheres. When constructed horizontally a tank requires foundations at frequent intervals to guard against sagging and when placed vertically the small diameter compared with the height requires extra foundations to provide rigidity. On a sphere it is only necessary to provide support for the dead weight as rigidity and absence of any sagging action are inherent advantages of the design. Because of these facts whenever the cost of steel work alone is slightly favorable to the tank type of construction foundation costs should also be checked before a final decision is rendered.

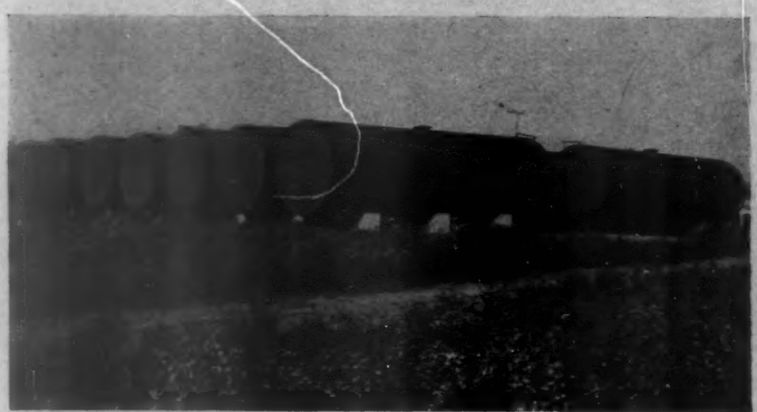
The theoretical advantage of spheres is that the stress in the steel being equal in all directions all seams are subjected to equal strains. This should result in less leakage but experience has demonstrated that small leaks occur as frequently in both tank and sphere types while major leaks have a definite cause uncommon in either type and not inherent in structural design. With equal costs of steel work plus foundations there would only remain the advantage in some localities of a spherical container presenting a more attractive appearance than a tank. The advantage of attractiveness has been a decided factor in obtaining building permits in a number of localities but the choice of types as being the most attractive is not unanimous among public officials. Comparing volumes a sphere may usually be more easily landscaped than other types.

The largest spheres erected have been approximately 60 feet in diameter but have been restricted to a maximum pressure of 60 pounds above which greater economy results from the use of smaller diameters and an increased number of units. The more recent development of welded seams for spheres will increase the pressure range and will be a decided advantage in leakage mitigation.

Maintenance of high pressure storage holders consists mostly of painting. Leaks on riveted type holders should be caulked by expert steel workers as a novice may cause a seam or rivet to open up more than originally. Hand caulking is seldom as satisfactory as that accomplished with pneumatic tools. In estimates of maintenance costs ten per cent added to painting estimates should be ample to provide for caulking of riveted tanks. On welded tanks no addition is necessary for caulking as leaks are practically unknown after repair of any which may have been discovered during construction and corrected by rewelding.

On a horizontal cylindrical tank there is a measurable breathing action due to the vertical diameter increasing as the pressure is increased and correspondingly decreasing as the pressure drops. Breathing action while it may be contributory is not the prime cause of leakage as the end plate seams and those held rigid by founda-

(Continued on page 38)



Field of 10' diameter by 33' long cylindrical tanks of both riveted and welded construction completely erected at the mill and shipped intact. (Fig. 15)

Coordinated Research and Coordinated Rate Making

*Excerpts of an Address before the 2nd Congress of the International Gas Union at Zurich**

By CLIFFORD E. PAIGE

Vice-President, The Brooklyn Union Gas Company, Brooklyn, New York

RESEARCH and rate making are closely related, but, like the hen and the egg, we don't know which came first. We do know that in the beginning both were rather crude.

Over a period of years, the chief improvement from coordination in research and in rate making, in the United States and Canada, has been a keener appreciation of promotional possibilities, an extension of gas service to new fields of operation, as well as a refinement and perfection of service necessary to meet any competition.

Rates are established to meet needs. Research designs and develops rates for diverse and specific purposes.

Rate research is involved largely with differentials. General research involves development of economical operation. For all rate structures must pass the test of harmony and must be designed to bring in no more than a reasonable return on a fair value of the property used and useful in the business. This is usually prescribed by regulation, and competition is an equally effective monitor.

In order to present the matter clearly, it is necessary first to establish the background of general research in the industry.

The production, transmission, distribution and utilization of gas have developed a technique incident to the peculiarities of the business. Whereas most manufacturers and producers limit their activities to single operations and depend upon wholesalers, retailers, and others to complete their services to the consumer, gas utilities must assume every role from producer to retailer and service man. The entire responsibility of serving the customer is centered in one organization, from procuring raw materials to the delivery of the finished product to the consumer in such a way as to give him complete satisfaction with his result.

Certain problems in research may be conducted by individual companies. Problems which are common should usually be approached collectively by the industry. This arrangement, where reasonable, assures the most comprehensive result at the lowest cost. Experience has made research on the cooperative basis an integral part of gas industry procedure in America.

In our country, cooperative research has centered in the American Gas Association. The membership in the association is fully representative of the entire industry in the United States and Canada. This makes available an enormous amount of ability operating through a single clearing house.

Research in rate-making has grown to be a matter of great importance. Rates must be adequate to support the business, yet they must be designed to attract business. Different rates for different conditions must be delicately balanced. Questions of cost of service, cost of commodity and cost of demand must be carefully weighed.

Scientific rate-making, however perfect, must take into account public acceptance, if the rate is to be successful. Rates which sell below cost to one group, with the expectation of making up losses by higher rates to other groups, are generally unsound.

Recognizing the importance of the subject, the American Gas Association, almost since its formation, has had two strong and active Committees on Rates. These committees, known as the Rate Structure Committee and the Rate Fundamentals Committee, are made up of men who specialize on rates and, for the most

---

* *Sept. 1st to 4th, 1934.*

part, devote their entire time to consideration of the rate problems of the companies by which they are employed.

During the past twelve years, these committees have issued numerous reports on the basic principles of gas rate structure, their adaptation to the needs of the industry and methods of procedure in practical rate making.

From a study of these reports, it might seem that the field of rate structures has been dealt with so thoroughly that nothing more can or should be added. Conditions having to do with rate matters, however, are never stationary. While the findings of the association on the basic principles of rate structure may not change from year to year, because of their fundamental soundness, the application of these principles to current conditions has brought a succession of new rate problems.

The principles as recommended by the committees have weathered the test of time and have been demonstrated as correct. In fact, when reviewed in the light of present developments, the prophetic character of the past pronouncements of the Rate Structure Committee of the American Gas Association is revealed.

The problems incident to the introduction of natural gas into communities formerly supplied with manufactured gas, with consequent large increase in heating value per cubic foot, brought about a serious consideration of the therm method of charging, so generally adopted throughout Great Britain. The increased heating value per cubic foot of the natural gas results in decrease in volume consumed without a corresponding reduction in operating costs or fixed charges. Hence, rates based upon volume would have to be increased in order to maintain adequate revenue, with almost inevitable misunderstanding on the part of the public as a result. Thermal rates, based on heat units delivered, would require far less adjustment under such circumstances and appear to be more conducive to good public relations.

Thermal gas rates now have a place in the rate schedules of 46 separate operating companies in the United States serving 650 communities in 13 states. Of these, 17 companies supplying over 1,400,000 customers in 278 communities have abandoned cubic foot rates entirely. This number of customers constitutes over 9% of the total in the United States.

The Rate Structure Committee in its 1933 report recommended that the industry address itself promptly to the adoption of sixteen measures. These recommendations bear repetition here as they plainly indicate the present rate situation and disclose the probabilities for the future, in the United States.

1. That in order to introduce successfully sound principles of rate making into general use, the entire gas industry unite in the advocacy of those broad rate principles which are applicable in all rate structures at any time and in any place.

2. That the effort of the industry be directed to devising ways and means of obtaining the recognition and adoption of these principles.

3. That gas companies—both manufactured and natural—ascertain their costs by analyses, employing for that purpose the principles developed by this Committee.

4. That gas companies make customer analyses based on individual gas sales, nature of use, customer classifications, etc. Application of various test rates of different forms, each designed to yield the same total revenue, will indicate that the form of rate which more nearly approaches the scientifically correct rate will also be the most favorable rate for the majority of the customers.

5. That gas companies make economic surveys of the cost and results of gas utilization in each customer classification as compared with other types of energy which are or may be used and from this information determine the relative value of gas service to each class of customers.

6. That based upon a broad consideration of the analyses of use, the value of the service to the customers, the cost to the company of rendering this service and general business judgment, a rate policy be formulated and a program adopted which will result in the desired ultimate rate and rate structure. In any event a goal should be definitely established and all efforts directed toward its attainment.

It is clearly the duty of management to make such analyses and to determine therefrom the appropriate form of gas rates. In fact, rate making is exclusively the function of management and, because of the vital effects on earnings, must be performed by the designated officials with no less courage and efficiency than other more generally accepted managerial duties.

7. That rate schedules for various service classifications have the greatest possible simplicity consistent with flexibility and adequate coverage of each classification.

8. Class rates may be advantageously used in many cases to supplement general service rates. When class rates are used as a temporary substitute for a general service rate the design should be such as will facilitate eventual blending into the general service rate when it assumes the desired form.

9. Optional rates without restrictions as to availability are not generally recommended. Under some circumstances, however, such rates may be justified as a step in the direction of desired general service rates and as a means of educating a large cross-section of the customers to an appreciation of the advantages of the test rates. Restrictive optional schedules available under limited conditions assume the advantages and characteristics of class rates and are more generally placed in the latter classification.

10. Inducement rates are desirable only when, in form and amount, they are based on sound principles of rate structure. Rates made with the primary purpose of business promotion must especially give appropriate weight to cost analyses under the conditions which will prevail after the estimated load has been acquired.

Unsound inducement rate exploitations by sellers of competing forms of energy cannot be satisfactorily overcome by the adoption of similar unsound practices.

11. When preparing the rate form and schedule, those preferences of customers, which are substantially uniform throughout the industry, should be deferred to in so far as possible.

12. Each change in condition offers a new opportunity for improvement in rate form. For example, the occasion of reductions in average rate, with increasing volume of business, usually affords a particularly favorable opportunity for needed rate structure improvement either in general or class schedules. Obviously, the nature and extent of equitable rate changes will be indicated most clearly when dealing with schedules based on sound principles of rate making.

13. Whenever rate schedules, not so based, are placed in effect despite company opposition, the committee calls attention to the necessity that a consistent and unmistakable record be made by the utility in each case. It should set forth the principles of rate making which are advocated by the company, and clearly indicate that the acceptance of the current rate schedule does not constitute abandonment of or disagreement with such principles.

14. While the field of temporary rates is outside the scope of usefulness of this committee, it nevertheless recommends that companies which are faced with industrial rate problems, arising from temporarily depressed industrial conditions, do not resort to the abandonment of established rate principles. It suggests rather that they take whatever action, with stated time limits, may be deemed appropriate in each situation in recognition of the temporary necessities of customers in such industrial classification.

15. The most effective rate work will be done when a unit of the organization, headed by an executive officer, assumes full and preferably undivided responsibility to the management for the formulation of rate policies, the preparation of data for rate cases and the development of all statistical information bearing on rates, sales policies and related subjects.

16. Companies and individuals may differ in opinion as to systems of cost allocations and customer analyses, the exact form in which the rate is stated and other details. Such matters are of considerable importance and are not to be disposed of lightly. However, the committee is of the opinion that the acceptance and adoption of basically correct rate principles should not be confused or delayed because of individual preferences and opinions, and local requirements as to detail.

Research is the watchword, the open sesame to the future. The gas industry is fortunate in having learned how to use research.

The Employee In Customer's Service Work

By JOHN E. GODSOE

Superintendent of Distribution, Brooklyn Borough Gas Company

AS A PERSON may be judged by the company he or she keeps, so a Gas Company may be judged by the employees that it keeps, and generally is. Notwithstanding the public influence wielded by politician or press, to the average utility customer, the Gas Company is what its employees are.

If we grant the value of good public relationship, then we must grant that in the customer contacts necessitated by the nature of our business, we possess a medium of potential good or evil, dependent upon the quality of those contacts.

The contacts made by employees of the customer's service division, in point of quantity, are more than those made by employees of any other department and psychologically are, perhaps, the most important from the viewpoint of impressions created. The work of this department is made within the sacred confines of the customer's home and under the customer's scrutiny. In most instances it is performed because of customer's request and this fact in itself is productive of a critical attitude on the part of the customer.

When the pet cake that Mrs. Jones has been baking for a tea or social gathering fails to assume the anticipated delicate brown because the oven heat control is off by several degrees, Mrs. Jones is apt to be laboring under a tension that requires the careful ministrations of not only a good mechanic but a tactful representative of the gas company, and the serviceman has got to act well in both capacities.

Mrs. Jones is much perturbed. That cake was intended as a piece de resistance. Here in her kitchen and in answer to her summons is the gas company in flesh and blood, and, as the gas company, the serviceman is associated in her mind with the over or under-done failure of her efforts. A bungling job, soiled shoes or hands, lack of courtesy or an unshaven face; any or all of these belong to the gas company. They are the gas company and whenever Mrs. Jones has occasion to think of the gas company, she visualizes it in the person of this serviceman.

In the not so distant past, it was the duty of the gas fitter to set a meter, regulate a range or blow a service and when any of these were finished, he had performed what constituted the extent of customer service requirements. His much white-leaded overalls and raucous "Gas Man, Lady" were of the days of black-iron sinks, lead plumbing and inefficient appliances.

This is not intended as an indictment of the gas fitter. He was of the pathfinding pioneer appliance days; a useful part of an era when competition was less keen and the superiority of gas over other fuels was sold with less sales effort than that required today.

Times have changed. In matter of years, it is not a far cry from the old black-iron gas range or the tank water heater, bedecked with cobwebs and located in the dark, subterranean recesses of a gloomy cellar, to the modern insulated, heat controlled and efficient unit of combustion that heats water efficiently, prepares food like a master chef or preserves edibles in the most scientific manner.

With the advent of such modern appliances, the era of the gas-fitter waned.. More than a stillson wrench or a pot of pipe dope is required to set a water heater thermostat, time an oven heat regulator, adjust a refrigerator, or convince a house heating customer that the colder the weather the more fuel will be consumed whether it be coal, oil or gas.

The Madam of the house expects the serviceman to understand all of the technicalities of her gas appliances. She expects him to be careful of her tiled walls, her linoleumed floors and the porcelain appurtenances of her kitchen. She resents a lack of courteous attention and is ruffled by any failure, on the part of the serviceman, to observe the niceties of good breeding.

The transition from the pre-automatic appliance days demanded a change in service-giving technique. The old time gas fitter was drawn over into the new era and means were established, intended to enable him to emerge from his chrysalis state. Schools, study courses and training periods were inaugurated in an earnest endeavor to remodel him. All of this has had a definite value, yet the premature graying hair of many customer service directors attest to how far short these efforts have fallen.

It seems to the writer that with the class of appliances on our lines and in keeping with those standards of living which we have reached that we must draw into the ranks of our customer service work, material with more technical training and background than that possessed by the gas fitter. With the value of employee selling programs being stressed and intensive campaign in effect or about to become effective, we must fortify ourselves with the best of personnel material in that department, which after all must keep perpetually sold what any sales program is able to sell.

A Thermal-Conductivity Apparatus for Continuous Determination of the Helium Content of Natural Gas

By ALLEN S. SMITH

Associate Physical Chemist, U. S. Bureau of Mines, Amarillo, Texas

ANALYSIS of the helium content of a natural gas presents more than the usual difficulties encountered in applying the thermal-conductivity method because of the relatively small amounts of this inert gas present and the wide variation in the other constituents. However, the numerous advantages of this method and its adaptability to continuously recording and control instruments make it worthy of consideration. A specific application of the method described yields quantitative results only when used with gas mixtures of known qualitative compositions which vary within predetermined limits. Periodic analyses for the helium content of a producing gas well may be conveniently made by an absorption method, and a continuous analytical method is not necessary for this purpose.

An apparatus to analyze the processed gas continuously and record its helium content automatically has been a recognized desirability for some time. Irregularities in plant operations would become apparent with such an apparatus, and operations could be modified to smooth out these undesirable conditions and to obtain greater efficiency and economy in operation. By integrating the record the recovery could be calculated more accurately.

Notwithstanding the relatively large thermal conductivity of helium its small concentration makes a direct measurement of its variation impossible. By combustion of the hydrocarbons and removal of the combustion products the relative volume of helium can be increased considerably so that its concentration may be measured by a thermal-conductivity method without appreciable effect of the variations in the other constituents. In designing an apparatus to determine the helium content of a natural gas in this manner it is desirable to consider (1) the expected composition of the gas and its variation, (2) the method of oxidation and the combustion products, and (3) the composition of the residual gas and its thermal conductivity. For this purpose three samples of gas containing the maximum, minimum, and average percentage of total hydrocarbons are used as a basis for computation. A definite volume of oxygen is mixed with the gas to accomplish combustion of some of the constituents of the sample, and by removing the products of combustion the relative volume of helium in the original sample is increased.

Development and Construction of Apparatus

The procedure to be followed in the determination of the helium content of natural gas has been indicated in the foregoing consideration of the design. Measured volumes of gas and oxygen are mixed and the hydrocarbons in the gas removed by combustion. The products of combustion are later condensed and absorbed, leaving a gas containing the nitrogen, the excess oxygen from combustion, and the helium, whose relative volume is now measurably increased. A flow sheet for the apparatus as developed is described, and the separate parts or processes

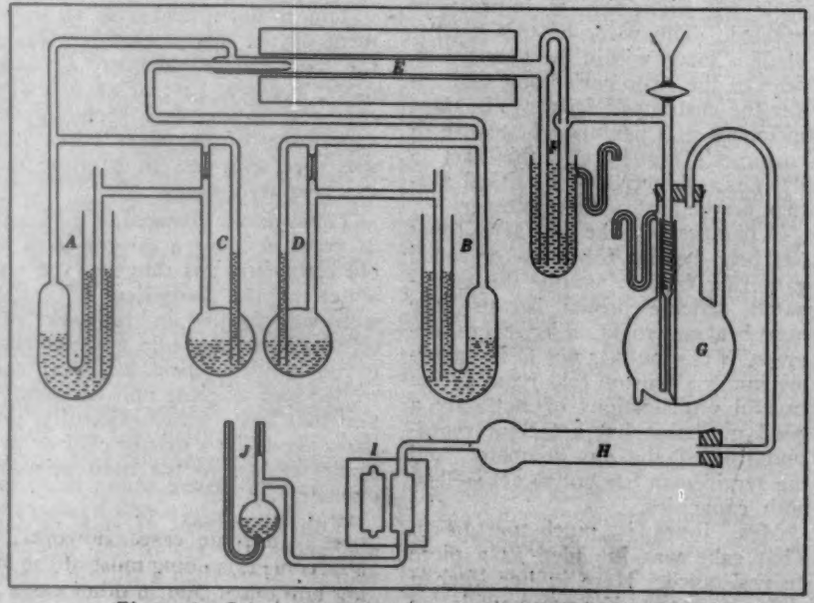


Figure 1.—Schematic diagram of helium-analysis apparatus.

An abstract from U. S. Bureau of Mines Report of Investigation 3250.

of the assembly are discussed. A schematic diagram of the method is shown in Figure 1.

The gas to be analyzed enters excess trap *A*, and enough oxygen for combustion enters a similar trap, *B* (Fig. 1), where their flow rates are maintained at a constant ratio, as indicated by the flow meters *C* and *D*. The measured volume of oxygen passes into quartz combustion tube *E* through a quartz jet sealed in one end of the tube. The gas enters the tube through a side arm sealed to the quartz combustion tube. Initial combustion probably takes place at the jet tip and continues to completion on the surface of the cobaltic oxide catalyst, which fills the tube and is maintained at a temperature of 800° C. by an electric furnace.

After combustion water vapor in the gas above the dew point is condensed and removed in the separator and water trap *F* following the furnace in the diagram. Carbon dioxide, as well as some water vapor, are absorbed in scrubber *G*, which contains a 20 per cent sodium hydroxide solution. The gas passes from the scrubber through an ascarite tube, *H*, where final traces of carbon dioxide and water vapor are removed, and then to measuring unit *I* and out through outlet flow meter *J*.

Operation and Maintenance

Although the apparatus is relatively fragile for an industrial plant instrument, it has been used satisfactorily at the Amarillo Helium Plant. It is mounted securely in a large cabinet, which was ventilated and protected from dust; no breakage has occurred since its installation.

The lag of the apparatus has been kept to a minimum by constructing the parts of small-diameter tubing and by using a small-bore sampling line with a rapid flow of gas. The lag in the apparatus as installed is approximately 5 minutes.

During continuous operation of the apparatus as constructed a small amount of attention is required each 24-hour period. The caustic solution must be renewed and the ascarite dryer inspected and changed if necessary. Normal variations in temperature do not appreciably affect the reliability of the apparatus, but it is recommended that variations greater than ± 5° C. from the calibration temperature be avoided. The cells are operated at a constant current; this must be observed occasionally and adjustment made if necessary. The inlet-gas flows must be maintained at the proper levels on the inlet flow meters. The apparatus should be checked weekly with a standard gas sample or more frequently if experience has shown it to be necessary.

The development and construction of the apparatus is described in detail because of the general applicability of the method to other gases and gas mixtures.

Dr. Haney Says—

In the July issue of "The Bulletin of the National Association of Purchasing Agents" Dr. Lewis H. Haney, Professor of Economics and author of several books on economics and business forecasting brings out the following facts about "price fixing":

For some time it has been apparent that the Administration would change its attitude in the matter of price fixing. On June 7 General Johnson issued an edict that no new price-fixing arrangements would be allowed in forthcoming codes, and at the same time there was a more or less vague pronouncement about revising such arrangements in existing codes.

Probably the chief reasons have been as follows: (1) Prices in a good many cases have been marked up more rapidly than the purchasing power of consumers could rise. This has hurt farmers and laborers, and has offset what has been done to increase their incomes, thus stultifying the New Deal's attempt to redistribute wealth and incomes.

(2) High prices have been a drag on the building industries, and long ago the government showed its realization that price boosting is not always desirable, by forcing the steel manufacturers to reduce prices to the railways and by attacking cement prices. Already the lumber industry has been forced to make a general reduction under the code.

(3) Then again, it has been more or less vaguely realized that fixing prices means prices that are so high that production is stimulated, even when over-production already exists. This is what makes the trouble in the oil industry, and we will have bootleg oil, copper, etc., as long as prices are fixed too high. It now seems that there will be at least 28,000,000 acres in cotton this year, against the Administration's plan of only 25,000,000 acres, and this is the result of artificially high prices maintained by the government. Steel production capacity actually increased last year, despite the well-known fact that there is a large excess capacity. The troubles of Blue Eagle copper illustrate the same point.

One illustration of the way the Administration is changing its views on the price-fixing matter is the Presidential edict that a 15% "tolerance" should be allowed in the case of government purchases. That is, even where prices are practically fixed under the so-called open price arrangement, a 15% reduction below the code price may be made on government contracts. It is apparently not entirely clear whether this reduction would be allowed on other business. In some cases, however, the government is doing most of the buying nowadays, and in other cases the government competes with private industry, as is notably the case in the Tennessee Valley.

There is also much talk about the desirability of price-fixing arrangements in the so-called natural resource industries, it being argued that this is necessary for the conservation of such resources. This, however, is a very doubtful point. Certainly limited natural resources should be conserved, but the way to do this is to compel conservative development of such resources where government action may be clearly necessary. To allow the marking up of prices for oil, lumber, etc., merely stimulates overproduction, and leads to the bootlegging of such products, as is well illustrated by the "hot oil" problem.

The current fear that prices will break, and that there will be an orgy of "chiselling" as a result of withdrawing price-fixing arrangements, but illustrates the dangerous situation which has developed, and proves the reality of price-fixing abuses. Whenever and as long as prices are fixed higher than is warranted by the market value of the product (which in the long run means fixed without due relation to the marginal cost of production) prices will be too high, and will both restrict the market and continually tend to break down because of the latent force of competition.

You can legislate competition out of existence, but you cannot legislate competitors away.

Potential For Gas

A survey of 275,000 one and two-family homes by The Brooklyn Union Gas Company, reveals its great value in their appliances sales plans.

ON August first The Brooklyn Union Gas Company had completed 70% of the survey begun last March to determine the actual existing market for gas refrigerators and gas unit heaters within the 275,000 one and two-family homes in the field the Company serves.

To gather the necessary information, the New Business Department depended upon meter readers, because: (1) they had the best access to customers' homes, thus able to obtain accurate data; (2) most economical (no more time expended than usually taken for meter reading); and (3) compensation could be given them for extra effort when sales were made, without incurring the outlay of a special appropriation for field labor.

The meter reader's book contained printed forms, with spaces for: name and address—type of home—in which company district located—and kind of refrigeration and water heating equipment currently being used, if any. This information was broken down and indexed on other sets of cards as to *kind of appliances, corresponding fuel and various fuel combinations* of the two classifications of appliances being surveyed.

Each given a designating color, for the purpose of quick recognition, these fuel combinations were divided into nine groups:

1. White—Coal Pot and Ice Box.
2. Canary—Coal Pot and Electric Refrigerator.
3. Goldenrod—Coal Pot and Gas Refrigerator.
4. Blue—Side Arm Gas Water Heater and Ice Box.
5. Buff—Side Arm Gas Water Heater and Electric Refrigerator.
6. Green—Side Arm Gas Water Heater and Gas Refrigerator.
7. Cherry—Automatic Gas Water Heater and Ice Box.
8. Pink Salmon—Automatic Gas Water Heater and Electric Refrigerator.
9. Grey—Automatic Gas Water Heater and Gas Refrigerator.

This detailed record of customer ownership was then passed on to the advertising and sales organizations, a copy going to each, and a third kept in the main office to receive any additional information natural developments might uncover with change in address checked through the billing department. Equipment sales were also noted on the record; and in this instance, the record itself was transferred to another fuel combination classification as the case dictated.

During the past few weeks a mailing of 5,000 highly personalized presentation letters on the advantages of Electrolux, signed by the salesman covering each territory and carrying the prospect's name printed at the top of the sheet, has been going out to persons shown in the survey now to be using ice boxes; and being followed up, within a short time, by a personal call by the salesman himself. While this procedure is expensive, at least a *Class Market* is being completely covered and results should prove proportionately gratifying.

One of the greatest values of the survey, revealed to date, comes from the economy of effort and expense put forth by the sales and advertising departments, who have been able to concentrate upon a relatively fewer number of prospects but ones more likely to be sold because of the evidence of their buying power in having previously purchased equipment. More pieces of direct mail can be sent to this smaller group more often; all at less expense. And sales effort will not be wasted by throwing it into oversold and 'no-money' markets since these pit-falls are distinctly shown in the analysis.

Here's a case showing how an analysis of this survey points directly to the PREFERRED prospect, hence the path of least sales-resistance. In a group of one-family units, where there were 389 homes with coal pots, approximately one-third have gas or electric refrigeration, indicating that this fractional number has a greater purchasing power to buy gas heating units. Incidentally, these 389 homes comprise 49% of the total residences in the group, a larger proportion than the average figure (25%) obtained from a summary of three groups picked at random. Of course this factor points out the fact that this particular group as a whole is a good POTENTIAL MARKET.

Then too, the inventory of the residences shows just which homes have gas refrigerators and gas heating units so there need be no waste coverage by broadsides of respective promotional matter.

The Company is satisfied that this survey, providing an exact index to present ownership, needs and requirements, is the most economical and foolproof method of obtaining potential market data, and much superior to the cross-section system, which merely signifies general indications, thus opening the way to hazardous opining. In fact it's the difference between absolutely KNOWING and ....partly guessing.

Inasmuch as the character of the completely tabulated survey is of localized import, THE JOURNAL *is not carrying these compilations in this news-story. However, if any reader desires this information, the editor will be pleased to forward it to him. We look forward to publishing the actual sales results which should follow this exhaustive market survey and analysis.*

Markets Appliances

A survey made by the U. S. Bureau of Foreign and Domestic Commerce in forty-eight cities shows great potential markets for domestic gas appliances.

THERE has just been made available statistics covering forty-eight of the sixty-four cities specially enumerated under the Real Property Inventory recently taken by the U. S. Bureau of Foreign and Domestic Commerce.

While electricity holds first rank in the lighting field, and gas maintains its supremacy in the cooking field, both of these utilities are used in the more recently developing mechanical refrigeration field.

Of the 1,114,033 dwellings enumerated in the forty-eight cities, 238,242 units or 16.8 per cent. were provided with mechanical refrigeration. The number of dwelling units not supplied with electricity or gas for cooking purposes total 431,406 units, or 30.3 per cent.

Mechanical Refrigeration

The West North Central Division of the United States containing the Inventory cities of Des Moines, Fargo, Lincoln, Springfield, Mo., St. Joseph, Sioux Falls and Wichita, held first rank in the percentage of its dwelling units equipped with mechanical refrigeration, with a rate of 20.2 per cent. The Mountain Division followed a close second with a percentage rate of use of 19.0 per cent, with the other geographical divisions ranking as follows: Pacific 18.8; South Atlantic 18.6; West South Central 17.2; East North Central 15.9; Middle Atlantic 14.8; New England 13.1; and the East South Central 10.7 per cent.

In comparing, however, the number of dwelling units in the respective geographical divisions provided with mechanical refrigeration with the total number of dwellings in the fifty-five cities enumerated, first rank laurels would be transferred from the West North Central Division to the Pacific Division. This latter division, represented in the 55 cities by the cities of Portland, Ore., and Sacremento and San Diego, Cal., had a larger number of units provided with mechanical refrigeration than any of the other divisions, the total being 40,410, giving it a percentage rate when compared with the total of 1,421,096 dwelling units enumerated, of 2.8 per cent. The West South Central Division, when similarly compared, had a percentage rate of 2.6; West North Central 2.5; South Atlantic 2.2; Middle Atlantic 1.8; Mountain 1.5; East North Central 1.3; East South Central 1.1; and New England 0.8 per cent.

Of the fifty-five cities, Lincoln, Nebraska, has the largest percentage of dwelling units provided with mechanical refrigeration, with a rate of 27.5 per cent., followed by Fargo with 25.8; Richmond with 25.6; Salt Lake City with 23.8; Oklahoma City with 23.7; and Wichita, Kansas, with 22.0 per cent. The lowest percentage goes to Paducah, Kentucky, with a rate of 6.4; Charleston and Butte have but a slightly better rate, or 9.1; and Erie and Casper close followers with 9.2 per cent.

The report on each city states the type of dwelling, condition, rents, cooking facilities, heating and kinds of fuel used, etc.

The following table shows the number of homes using gas for cooking as compared with electricity, as well as the number of homes using other fuel for cooking. Also data on water heating and house heating, showing the number of homes in each city that have only cold water, those having hot and cold water and homes having no running water. In the house heating section is included a number of homes heated with gas, coal, oil and a number using other fuels. *(See Table on next page.)*

What Are You Going To Do About It?

This Government survey should bring out a lot of constructive thought and aggressive action on the part of gas company merchandisers. True, the inventory is not complete in itself; and leaves much to be desired by the gas appliance sales manager. Yet, even in its general coverage of sixty-five cities, the IMPORTANT fact revealed is that big POTENTIAL MARKETS do exist.

Regardless of your geographical location, the Government survey should be the inducement to get you started on your own survey.

In this issue, you will learn how The Brooklyn Union Gas Company made a survey of 275,000 homes at very small expense. YOU can do the SAME THING.

Get your market down on paper (only one meaning!). Know just how many gas ranges and gas heating units and gas refrigerators CAN be sold in your territory.

Tabulated Survey of 48 Cities

State & City	Cooking Facilities: Using Gas	Using Elec.	Not Using Gas or Elec.	Water Facilities: Cold only	Hot & Cold	None	House Heating (Fuel): Gas	Coal	Oil	Other Fuels
Ala., Birmingham	35,987	942	64,749	57,869	28,581	15,214	693	94,762	141	5,963
Arizona, Phoenix	10,955	98	3,285	4,668	8,773	936	442	5,022	989	7,641
Ark., Little Rock	18,074	50	9,607	6,021	15,251	6,494	17,156	514	13	9,930
Calif., Sacramento	29,404	1,406	5,504	7,258	27,381	1,773	12,424	2,528	1,126	19,731
Calif., San Diego	59,355	435	3,794	9,850	53,380	400	29,058	22,442	2,130	30,152
Colo., Pueblo	4,613	1,464	6,465	2,790	8,863	1,050	518	11,915	39	102
Conn., Waterbury	24,806	181	5,280	8,982	20,488	819	59	19,206	2,000	8,959
Ga., Atlanta	46,833	3,531	45,169	39,814	42,461	13,258	2,374	89,951	430	2,281
Ill., Decatur	12,950	28	3,278	3,591	11,305	1,460	226	15,888	151	64
Ill., Peoria	28,342	150	7,505	12,141	19,693	3,989	673	33,798	853	464
Iowa, Des Moines	35,488	233	9,129	7,538	30,001	7,315	811	41,636	2,142	226
Ind., Indianapolis	92,026	569	33,359	28,412	73,913	23,363	41	121,083	2,106	2,248
Fla., Jacksonville	10,153	2,831	29,407	24,501	13,072	4,898	749	9,678	621	31,218
Kans., Topeka	15,855	61	3,169	3,679	12,039	3,372	5,114	11,846	239	1,827
Kans., Wichita	27,059	213	6,752	3,791	24,975	5,275	15,830	14,667	658	2,826
La., Baton Rouge	4,279	10	3,232	4,550	2,610	486	3,598	1,738	61	1,726
La., Shreveport	20,044	6	1,785	7,454	11,733	2,675	20,264	36	1	1,377
Me., Portland	13,288	294	5,868	3,846	15,634	125	62	15,916	2,109	1,424
Mass., Worcester	44,274	950	23,892	22,562	44,998	1,656	110	46,212	8,012	14,544
Md., Frederick	1,701	170	1,896	1,418	2,235	125	0	3,644	38	95
Mich., Lansing	15,714	1,055	4,030	4,666	15,418	723	45	20,253	346	135
Minn., Minneapolis	124,563	2,957	12,718	28,926	103,463	7,876	345	121,915	13,544	3,895
Minn., St. Paul	72,625	941	12,585	18,619	61,444	6,093	48	75,452	7,542	3,006
Miss., Jackson	6,161	3	5,219	4,247	5,720	1,449	6,108	2,456	0	2,847
Mo., St. Joseph	12,324	251	7,348	8,050	10,248	1,630	1,591	16,765	1,106	453
Mo., Springfield	8,164	109	7,809	7,649	6,184	2,298	733	9,689	568	5,016
Nebr., Lincoln	18,608	102	4,403	4,284	17,964	912	2,903	16,943	2,371	857
N. J., Trenton	36,350	36	6,284	6,415	34,925	1,432	83	40,280	1,597	710
N. M., Santa Fe	877	77	1,757	421	1,523	770	819	941	9	945
N. C., Asheville	2,261	815	9,498	4,116	7,838	623	1	12,306	43	200
N. C., Greensboro	3,959	352	7,731	5,507	5,276	1,269	2	11,534	64	433
N. M., Albuquerque	4,741	64	2,996	1,032	5,905	878	1,592	5,631	90	489
N. Y., Binghamton	26,342	329	5,703	3,778	27,882	735	208	31,118	629	432
N. Y., Syracuse	59,197	336	5,613	11,920	51,959	1,643	400	63,413	710	574
Okla., Oklahoma City	43,096	103	6,470	5,080	36,113	29	41,968	3,039	104	4,114
Ohio, Zanesville	9,347	95	1,481	3,077	6,639	961	809	9,802	1	62
Pa., Erie	31,052	32	2,062	4,673	27,391	1,106	1,280	27,618	239	3,925
Pa., Williamsport	9,070	58	2,862	2,815	9,172	126	73	11,746	225	57
R. I., Providence	128,789	1,673	39,155	93,214	71,798	4,771	431	112,197	10,341	45,976
S. C., Charleston	6,291	182	11,414	10,321	3,702	3,881	276	4,761	576	11,790
Tenn., Knoxville	5,477	629	26,156	12,715	13,398	6,153	6	30,117	15	2,097
Texas, Austin	9,290	41	5,043	5,507	6,447	2,435	8,430	237	66	5,642
Texas, Dallas	66,043	298	17,187	19,687	53,475	10,465	64,448	953	77	18,018
Utah, Salt Lake City	14,325	9,717	24,078	5,666	39,646	2,807	6,345	41,031	202	249
Va., Richmond	28,743	1,924	24,257	23,214	24,346	7,838	34	48,763	1,217	47,402
Wash., Seattle	42,930	37,899	54,651	8,741	121,660	5,113	722	50,649	36,308	47,502
Wis., Kenosha	11,690	98	2,036	2,812	9,938	1,083	14	13,388	383	45
Wis., Racine	17,135	288	2,818	4,601	14,266	1,359	32	19,248	758	135

They Say . . . Opinions and Comments

(Continued from page 7)

in this instance, the cumulative value of such publicizing has a good chance to prove its efficiency. The sales records of the Company support its estimated value.

FOR THE NEXT six months at least, the general content of run-of-the-paper merchandising articles will reflect our firmly-rooted conviction that the time is ripe to make definite plans to SELL GAS APPLIANCES.

Our purpose is to bring to your attention what has been done, what is being done and what YOU can do in uncovering YOUR POTENTIAL MARKET and then aggressively selling it.

In this connection we refer you to the two news-stories captioned "Potential Markets" in this issue.

AND HERE'S a little "inside stuff" . . . Before the dust had settled on the new furniture in the recently established New York office of the Federal Housing Administration, we had exchanged letters with Julian M. Gerard, Regional Director, regarding a subject which should be of intense interest to every merchandiser and manufacturer in the industry.

It is our contention that purchase of ANY gas appliance should be provided for by loans partially guaranteed by FHA funds, although present regulations discriminate against those appliances which are not permanent fixtures of the house.

The dividing line between permanent fixtures and movable fixtures is so fine; and, in view of the tremendous market which could be opened up through use of loans to buy ALL gas appliances, we sincerely believe that the FHA regulations should be changed to include such improvements as a basis for funds.

At any rate, we have brought this situation to the attention of leading manufacturers; and trust that concerted action by them may be instrumental in effecting a change in FHA rulings so that ALL GAS APPLIANCES may be purchased with such loan-funds.

Competitive House Heating Fuels And Relative Costs

By H. P. MOREHOUSE

Public Service Electric & Gas Co., Newark, N. J.

IT is hardly necessary to point out that the cost of automatic gas heating does not need to meet the costs of other methods of automatic heating to be saleable. Gas has enough genuinely superior qualities that make it the best method of automatic heating, or automatic winter air conditioning, so that it can be sold in spite of some price differential.

The problem before the house heating departments is to convince the public, not that it is the cheapest way to heat, but first that there is much less difference between gas, and other fuels, than is generally believed, when all of the "plus" charges are considered; and second that gas heating is more than worth this difference.

A study of Figure I shows why gas is worth more than other methods of automatic heating. There are more "A" ratings for gas heating than any other method of heating.

In presenting the case of gas versus other methods of automatic heating with reference to cost, it is recommended that forms be prepared to make it easy for the salesman to present his case in an orderly and convincing manner. A suggested form that has been used with some success is shown in Figure II.

The first half of the sheet deals with investment costs. The case of gas can very often be made attractive by recommending heat saving devices such as storm sash, weather stripping and insulation. These heat savers can often be applied without running up the initial investments much, if any, above the costs of competitive equipment such as oil for example. If the competition recommends an oil boiler-burner unit a gas-designed boiler may be sold with heat saving devices, at, or near, the same investment costs. If the competition recommends an ash pit oil burner then an automatic gas burner plus

Figure I

	Gas Heating	*Oil Boiler Burner Units*	*Ash Pit Oil Burner*	*Coal Stoker*	*Hand Fired Coal or Coke*
Automatic	A	B	B	C	D
Reliability	A	B	B	C	C to D
Flexibility	A	A	A	B to C	D
Cleanliness	A	A to B	B to C	C	D
Quietness	A	B	B to C	A	D
Cost of Fuel*	C	A to B	B	A	B
Power Costs	A	C	C	C to D	A
Investment	B	D	B to C	B to C	A
Service	A	B	B	C	C
Depreciation	A	B	C	D	A
Mechanical troubles	A	C	C	D	A

A = Excellent. B = Good. C = Fair. D = Poor.

* For discussion of comparative efficiencies of gas-designed and conversion house heating burners, see "Automatic Gas Burners" By C. Geo. Segeler in the July 1932 issue of Heating, Piping and Air Conditioning. Reprints are available from A.G.A. Headquarters.

Figure II

FUEL COST ANALYSIS

Investment Costs
GAS

Equipment .....
Roof Insulation .....
Wall Insulation .....
Weather Stripping .....
Storm Sash .....
Total Investment _____
Sq. Ft. Theo. Radiation ..... _____

Investment Costs
OIL

Equipment .....

Total Investment _____
Sq. Ft. Theo. Radiation ..... _____

Annual Operating Costs
GAS

Fuel—— MCF @—— .....
Service .....
Power .....
Repairs 1% initial investment .....
Interest on increased investment .....
Depreciation ..... _____ 20 years
Cooking & Water Heating ——Cu ft x Rate x 12 Mos.

Total Operating Cost _____

Difference in favor of: oil / gas _____ per year.

Annual Operating Costs
OIL

Fuel—— gals. @—— .....
Service .....
Power .....
Repairs 1% initial investment .....
Interest on increased investment .....
Depreciation ..... _____ years
Water Heating (Summer Fuel bill) .....
Cooking ——cu. ft x Rate x 12 Mos...
Total Operating Cost _____

Difference in favor of: oil / gas _____ per year.

heat saving devices may be recommended.

This type of comparison sheet can also be used to protect the automatic heating load already on the lines. In such a case there is no additional investment necessary for gas equipment and the money spent for an oil burner or coal stoker might be spent for heat saving devices.

Figure III

Character of Losses	*Percent of Total Loss*	*Percent that could be saved*	*Method used*
Roof	15%	9%	*Insulation
Floor	5%	—	
Side Walls	26%	15%	*Insulation
Glass	30%	18%	Storm Sash
Infiltration	24%	8%	Weatherstrip
Total	100%	50%	

*Based on 3⅝" of insulating wool.

Of course heat saving devices may also be applied to the competitive fuel but this will run up the initial investment, whereas the comparison was made to show what could be done with gas for approximately the same price that would be paid for competitive equipment. Furthermore, with an oil burner or an automatic stoker there are certain plus charges such as power, repairs, service, depreciation, which do not appear or are negligible compared to these charges with coal or oil heating. Saving *fuel* does not affect these high plus charges, thus the over-all heating costs are not reduced in proportion to the reduction found with gas fuel. It would be well for the salesman to have a form filled in for the case of heating with the competitive fuel, with insulation, to bring out this point.

In tying in these heat saving devices with your house heating campaign, weather stripping and storm sash should be given proper consideration. The latter is often neglected because of the impression there is prejudice against it. One of the best ways of overcoming this prejudice is to show a prospect what storm sash means to him in his fuel bills, and often-times the prejudice disappears.

A study has been made of the heat losses from a group of single family 2½ story houses. By heat loss calculation it was determined that the heat is dissipated about in the proportions indicated in Figure III. The third column of Figure III gives an idea of what percentage we might expect to save. The method used to make that saving appears in the last column. Of course figures simply express averages and could not be applied to any individual house.

Some utilities are merchandising insulation. Others are cooperating with the insulation companies. Regardless of the merchandising policy it seems desirable to have a coordinated policy of promoting these aids to gas heating. The Committee believes that this can best be accomplished by coordinating the activities of the distributors of insulation, storm sash, weather stripping and calking. The policy of calling in several distributors each handling a separate product complicates the sale not only of the heat saving devices but of gas heating as well. The gas story with building treatment materials for reducing heat losses could be much more simply and forcibly presented if it were possible for the gas company to call in a reliable firm who are heat treatment specialists, who have an equal interest in selling all types of heat saving devices and who with the aid of the gas heating salesman's survey can recommend what is best for the prospects from the standpoint of comfort and return on his investment. This policy should also reduce overhead and bring down the cost of all heat saving devices.

Having set up the investment costs as outlined in Figure II, the next step in using the analysis sheet is to point out to the prospect what he gets for his money. To deal with an actual case let us consider a prospect with a six or seven room house having 364 sq. ft. of Theo. Steam Radiation. The initial investment as shown in Figure IV is $26.43 higher in the case of gas, but this is what the prospect gets for his money.

GAS

1. The best method of home heating.
2. A more comfortable house in Winter since cold spots and drafts will be reduced.
3. A more comfortable house in Summer, which feature alone may be worth the increased cost to the prospect.
4. A more valuable home because insulation makes it more saleable.
5. Insulation reduces the fire hazard and makes home more vermin-proof.

OIL

1. A good oil heating unit but subject to the shortcomings of oil heating.

The operating costs show that gas in this case is actually $12.85 cheaper than oil after all "plus" charges have been considered. Such an analysis will not always show that gas is cheaper than oil even at the rates given. Under certain favorable conditions frequently found in the field, however, gas may be cheaper. The analysis will always show that there is less difference than is generally believed.

Figure IV

Fuel Cost Analysis

Investment Costs

GAS

Equipment: Gas Boiler	$509.43
Roof Insulation	85.00
Wall Insulation	317.00
Weather Stripping	
Storm Sash	75.00
Total investment	$986.43

Annual Operating Costs

GAS

*Sq. Ft. Theo. Radiation	237
Fuel 285 MCF@6½c/C	$185.00
(No charge)	
Service	
Power	1.00
Repairs 1% initial investment	5.09
Interest on increased investment (986.43—960) x 6% =	1.59
Depreciation 509.43÷20 yrs. —	25.47
Cooking & Hot Water, 8000 cu. ft. x Rate x 12 mos. =	89.04
Total operating cost	= $307.19

Investment Costs

OIL

Equipment: Oil Boiler-Burner Unit	$960.00
Total investment	$960.00

Annual Operating Costs

OIL

*Sq Ft. Theo. Radiation	364
Fuel, 1800 gals.@7c	$126.00
Service (after 1st year)	25.00
Power (12 months)	20.00
Repairs 1% initial investment	9.60
Depreciation 960÷10 years =	96.00
Hot Water (already figured)	
Cooking $3.62 x 12 mos.	43.44
Total operating cost	$320.04

Difference in favor of Gas $12.85 per year.

*Radiation is reduced in this case from 364 sq. ft. to 237 sq. ft. through installation of heat-saving devices.

Figure V shows a typical analysis of an automatic gas burner against an ash pit type oil burner. And Figure VI shows an analysis of a coal stoker and boiler against a gas-designed boiler. In the case of the stoker comparison domestic water heating has been left out as it is

not thought desirable to run a stoker during the Summer just for hot-water service.

Figure VII shows an analysis where heat conservation materials have been applied to both gas and oil heating and shows clearly the advantage gained by insulation from a savings standpoint is not worth the investment with oil.

Figure V

Fuel Cost Analysis
Investment Costs

GAS

Equipment: Automatic Burner	$220.00
Roof Insulation	85.00
Wall Insulation	317.00
Weather Stripping	———
Storm Sash	75.00
Total investment	$697.00
Sq. Ft. Theo. Radiation	237

Annual Operating Costs

GAS

Fuel 299 MCF@6½c/C (No charge)	$194.35
Service	———
Power	1.00
Repairs 1% initial investment	2.20
Interest on increased investment ($697—$500)x6% =	11.82
Depreciation $220÷15 yrs.=	14.67
Cooking & Hot Water, 8000 cu. ft. x Rate x 12 mos.=	89.04
Total operating cost....=	$313.08

Investment Costs

OIL

Equipment: Ash Pit Type Oil Burner (with 500-gal. Tank)	$500.00
Total investment	$500.00
Sq. Ft. Theo. Radiation	364

Annual Operating Costs

OIL

Fuel 1950 gals.@7c.	$136.50
Service	25.00
Power	20.00
Repairs 1% initial investment	5.00
Depreciation $500÷7 years=	71.15
Hot Water (fuel already figured)	—
Cooking, 3000 c. ft. x Rate x 12 mos.=	43.44
Total operating cost....=	$301.09

Difference in favor of Oil $11.99 per year.

Difference in favor of Oil $1.50 per month.

Figure VI

Fuel Cost Analysis
Investment Costs

GAS

Equipment: Gas Boiler	$509.43
Roof Insulation	85.00
Wall Insulation	317.00
Storm Sash	75.00
Total investment	$986.43
Sq. Ft. Theo. Radiation	237

Annual Operating Costs

GAS

Fuel 285 MCF@6½c/C (No charge)	$185.00
Service	———
Power	1.00
Repairs 1% initial investment	5.09
Interest on increased investment ($986.43—$700)@ 6%	17.18
Depreciation $509.43 20 years	25.47
Total operating cost ....=	$233.74

Investment Costs

COAL STOKER

Equipment: Coal Stoker and Boiler Unit	$700.00
Total investment	$700.00
Sq. Ft. Theo. Radiation	364

Annual Operating Costs

COAL STOKER

Fuel 11 tons@$7 ton	$ 77.00
Service	35.00
Power	20.00
Repairs 3% intial Stoker investment $500	15.00
Interest on increased investment	———
Depreciation $500/7 years + $200/20 years	81.40
Total operating cost....=	$228.40

Difference in favor of coal $5.34 per year.

Figure VII

Fuel Cost Analysis
Investment Costs

GAS

Equipment	$509.43
Roof Insulation	85.00
Wall Insulation	317.00
Weather Stripping	———
Storm Sash	75.00
Total investment	$986.43

Annual Operating Costs

GAS

Sq. Ft. Theo. Radiation	237
Fuel 285 MCF@6½c C.	$185.00
Service (no charge)	———
Power	1.00
Repairs 1% initial investment	5.09
Interest on increased investment ( ) × 6% =	———
Depreciation $509.43 20 yrs=	25.47
Cooking & Hot Water, 8000 c. ft. x Rate x 12 mo...=	89.04
Total operating cost....=	$305.60

Investment Costs

OIL

Equipment	$960.00
	85.00
	317.00
	75.00
Total investment	$1437.00

Annual Operating Costs

OIL

Sq. Ft. Theo. Radiation	237
Fuel, 1170 gals.@7c.	$81.90
Service	25.00
Power	20.00
Repairs 1% initial investment	9.60
Interest on increased investment ($1437—$986.43) x 6% =	27.03
Depreciation $960 10 yrs.=	96.00
Hot Water (already figured)	
Cooking, 3000 cu. ft. x Rate x 12 mo. =	43.44
Total operating cost....=	$302.97

Difference in favor of Oil $2.63 per year.

Recommendations:

In meeting competition both for holding present business and getting new load, gas companies should:

1. Coordinate the activities of distributors of heat-saving devices so that one or more concerns can be called on to quote, and install all building treatment materials for conservation of heat.

2. All information relating to the "plus" charges resulting from all methods of automatic heating should be studied for each locality and placed in the hands of gas-heating salesmen.

3. Management should prepare cost analysis sheets for their heating salesmen to use in breaking down the general impression that gas heating is so much more expensive than other methods of automatic heating.

Use Giant Pictures To Illustrate Window Display

By STUART BRATESMAN

Manager Display Department, Boston Consolidated Gas Company

IN preparing effective window display material the designer must be constantly on the lookout for new and interesting treatments and effects. A change, now and then, relieves what might otherwise become a monotonous procession of window displays, no matter how the ideas and color vary.

One eastern gas company recently started using giant photographic enlargements as illustrations for its displays. This treatment is not new, other companies having used it before, but the manner in which this particular company adapted the thought is worthy of mention.

Instead of buying prints outright from some photographic supply house, the original pictures were taken by the Display Department staff, in the studio, using company models. A great deal of imagination went into the preparation of this material. You will notice that all irrelevant detail has been eliminated from these pictures. Even the girl's head in one is omitted, as the need was felt to focus attention on the clock on the gas range. In other words, the material was treated exactly as a poster illustration, but in photographic form instead of hand-painted.

Now, how about the public reaction to this type of window display advertisement? It was found, after careful check, that just as many people stopped and read this photographic type as the poster backgrounds. An informal inquiry was made and these facts determined; the average person was impressed by the giant size of the picture, this was what first attracted their attention; it required no imagination to picture the thought behind the display, therefore it was easier to understand; the combination of the enlargement and the bright colors of the painted areas used with it made a perfect effect and utilized the best features of both techniques; and from an economy angle the enlargement type of display cost no more than the artist's time to paint the same story on beaverboard.

Glance through any magazine today. You will find over half the advertisements using pictures to illustrate their ideas. There must be a reason for this. The big advertising agencies employ experts whose sole

job is to find out the public's reaction to all types of media. Pictures play a big part in printed advertising,—why not in utility window displays?

All this might seem to some readers to sound the death knell of the utility poster background,—no such thing! These photographic displays should be used merely to vary the regular program of colorful poster thoughts. Forceful posters will always be effective, as long as advertising exists; it is a distinct form of expression that lends itself very quickly to gas appliance and gas service displays.

The gas company in question used three photographic enlargements quite sparingly. The Display Department created one of this type display to about every six posters. The effect can be imagined; a well rounded program of varying window advertisements that did its part in the promotional program of the company.

Gas Serves Bridgeton Despite Severe Flood

By JAÇOB B. JONES

Supt., Bridgeton Gas Light Company, Bridgeton, N. J.

THE recent severe flood conditions was the worst disaster that our Company has ever had to face in its seventy-seven years of operation. But we were able, under the most difficult circumstances, to uphold the tradition of no matter what happens "Keep Gas on the Town." The only interruption in our Gas service applied to about twenty consumers for the space of about thirty hours.

On the night of August 2nd it started to rain very hard about ten o'clock, and by midnight this had developed into a cloudburst.

At midnight we realized that it was an unusual storm and called the plant on the phone, to learn that about sixty feet of retaining wall, twenty feet in height, on the west line of our plant had collapsed, but otherwise the plant was operating and the holders were full.

At 1:30 in the morning we received a call saying that bridges over the Cohansey River had given away carrying our gas lines with them, and that the holders were falling rapidly.

I reached the plant within ten minutes after receiving this word and found that the Cohansey River was a swollen torrent, as a series of six lakes, several miles above the city, had given away, and the headwaters were all emptying into Cohansey River.

We immediately summoned all of the help possible, and our first thought was to install an emergency line from the river to our boiler plant to insure a water supply, as the flood had also carried away the water mains and the pressure was falling rapidly.

While this was being done my daughter, Helen, who is employed in the Gas Office, acted as my driver to make a quick survey of the damage and to see what should be done first. And in this connection permit me to say, she proved herself to be a regular gas man, as we drove all night long from point to point, after once we had assigned our men into several emergency gangs.

The rain stopped with the daylight, and when we could actually see the full extent of the damage it was appalling. The City was divided into two parts, all communication being carried away, and to get our equipment on the other side of the 150 foot river, it was necessary to travel forty miles by automobile.

By seven o'clock we had all of the broken mains stopped from leaking gas temporarily, but it seemed to be only the beginning of our trouble as the railroad line carrying coal into our plant was also washed away in the flood and our supply shut off.

The State Highway Department was appealed to and they responded promptly by starting to restore communication over the river with temporary bridges.

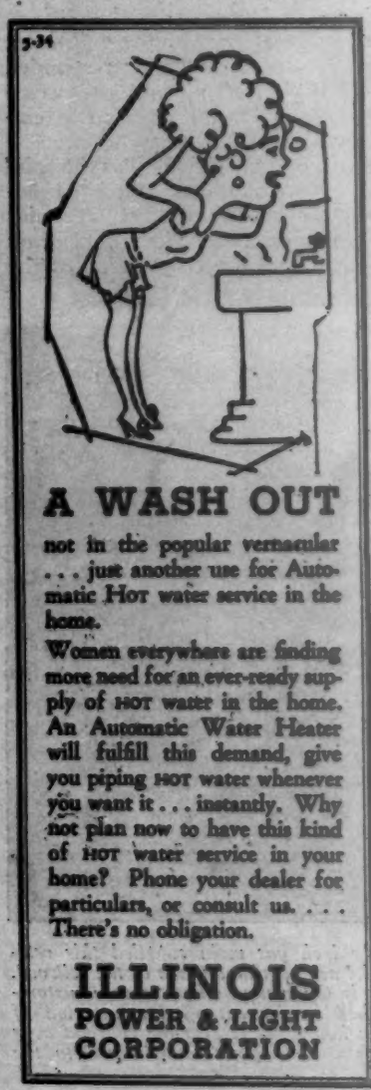
The remarkable thing was the spirit of cooperation that existed between the several utility companies in helping each other keep service on the town, and the cooperation of the men in all of the organizations.

A six inch gas main supplied this residential neighborhood north of the railroad. This is the section where twenty customers had service cut off for a period of thirty hours. It is also the railroad over which coal supply was delivered to the Plant.

SALES SLANTS

HERE'S a good idea, as we see it: A western gas company decides to reduce domestic rates. The management realized that this would mean an immediate reduction in revenue. How to overcome this was the problem? Then the sales promotion manager came to the rescue. Here is his idea. Go over all domestic service bills, figure the saving to be made by each customer, secure a printed insert showing the customer this saving and at the bottom of the insert show the customer that by paying what he now pays he may have the service he now has and in addition have silent gas refrigeration. In cases where the customer already had a gas refrigerator the insert said that the new rate would enable him to have automatic hot water service for about the same amount he was now paying for gas for cooking and refrigeration. When these inserts were sent with the bills the sales department was supplied with the names of customers to whom they were sent with instructions to contact them immediately with the view of selling them either automatic hot water service or silent gas refrigeration.

This idea seems to hold a lot of ideas for the merchandise manager whose company has given the customer a reduction in rates.


5-34
A WASH OUT
not in the popular vernacular . . . just another use for Automatic HOT water service in the home.
Women everywhere are finding more need for an ever-ready supply of HOT water in the home. An Automatic Water Heater will fulfill this demand, give you piping HOT water whenever you want it . . . instantly. Why not plan now to have this kind of HOT water service in your home? Phone your dealer for particulars, or consult us. . . . There's no obligation.
ILLINOIS
POWER & LIGHT
CORPORATION

—MRS. Purchasing Agent seems to be strengthening her forces. According to an article we read recently it is now estimated that 85% of the merchandise purchased for the home is purchased by women. This should be good news to those who sell home labor saving appliances.

GETTING the gyp out of business is going to be a big thing for the GAS man. He will at last be able to devote the time he has spent in the past combating "junk appliances" and in servicing the "cats and dogs" to selling folks the type of appliance that will render the most service and not have to throw in a set of dishes or a case of soap. As we view it, getting rid of the price cutter is going to enable the manufacturer to get out a better product and it is going to be of benefit to the other dealers who sell gas appliances as well for they will all be in a position to sell on a quality basis and a basis that will provide a profit on each sale.

TALKING to folks via "thumb-nail-ads" seems to be popular with a great many gas, as well as other, advertising men these days. Many of these small single column advertisements carry line illustrations that hold a humorous appeal with a paragraph or two of talk in the modern tempo. We are reproducing a couple of ads to illustrate what one man has done to popularize automatic gas hot water service.

ATTENTION: Sales and Advertising men! If your company is to go ahead, maintain the water heating and cooking load and secure a real refrigeration and home heating load, it is going to be up to you to push out front and produce new sales and advertising plans at once. We are about to embark upon an uncharted sea. There will be new customers, new problems, and the neglected kitchen and basement are going to give someone new business. Home managers are going to demand modern home appliances, dryers, heaters, incinerators, water heaters, ranges and GAS refrigeration. He who secures this business is going to do it by *plan* and with the aid of *advertising*.

IF your advertisements are clean, cheerful, and truthful, folks will respect them and when they appear in the newspapers or in the form of direct mail pieces folks will show their respect for them and you by reading them.

4-34
STUBBORN STUBBLES . . .
Take wings when there's plenty of HOT water at hand . . . and there's always plenty of it in the home that has an Automatic Water Heater.
You really can't appreciate what a joy and convenience real AUTOMATIC HOT WATER SERVICE is until you have it.
Why not give your family a "new deal" this year? Install an Automatic Water Heater in your home.
For prices and terms, 'phone us or any good dealer.
ILLINOIS
POWER & LIGHT
CORPORATION

GAS men who contemplate promoting the sale of the GAS home laundry dryer will get some ideas of how effectively display advertisements may put over the story, by studying the advertisement of the Columbia System, shown on this page. A series of these advertisements were used in various "Columbia" properties, the size being four columns by fifteen inches.

IT seems to me that the man who fails to take full advantage of the opportunity to dramatize the desirability of controlled heat provided by the new types of range burners is overlooking the best bet a gas range salesman ever had. "Yes indeed,

madam, every burner on this range may be controlled just as you please: every burner may be either a simmering, regular or giant burner. Let me demonstrate. Notice how the flame remains just where you want it, now note the hot blue spot of heat right in the center of this small Pyrex dish. Now I will remove the small dish and place this large one over the burner—see that spot—and note there's no waste heat for there's no flame running up the sides as was the case with the old type burners. This means a saving of gas and a speeding up of cookery."

GAS appliance dealers sell more merchandise to women than to men. It is for this reason that they should thoroughly understand the feminine viewpoint, buying motive and appeal.

IT seems that carefree hot water service has been the bane of woman's happiness since the time of Eve. That's what several home managers have intimated lately. Women are ever on the lookout for ways and means to secure such service. "The reason we have not bought one of these new heaters," she will say, "is because they cost so much and then

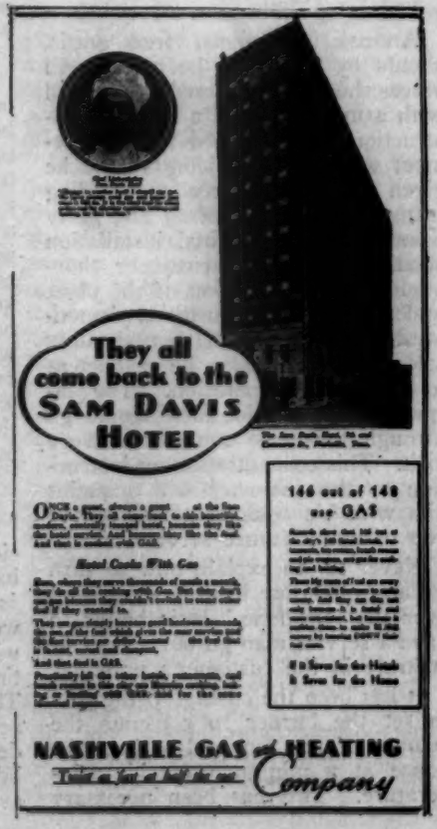
people tell me it costs an awful lot of money to run them." We repeat this to forewarn the man who expects to use the rental or guaranteed cost plan that we have heard about recently. Then we also offer it as a hint to the man who has no idea of using it but who hopes to get his share of the GAS water heater business by logical, straight-from-the-shoulder selling of Hot Water Service. Sell folks that good service of any sort costs money, but that it is worth all that it costs.

GAS men everywhere report that the "shoppers market" is turning from bargains to values. One man told us the other day that the volume purchases are going to gas ranges that retail from between $75 and $100. "We do sell a few of the higher price ranges and we will always carry a representative line of them for the folks who can afford to have something just a little bigger and better. However, the profitable, fast-selling lines are the console and table top types. The ranges are priced at from $75 to $100.

—THAT plan, that's going around, to have the home service director give the boys that visit homes with the idea of selling GAS cookery a few lessons is a dandy, in my way of thinking. Folks are out to buy what

advertising and the right kind of sales-promotion causes them to feel they need. Naturally the salesman who can approach them with the full knowledge of what gas ranges will do for them is going to get a hearing and if you ask me get the orders.

THE Nashville Gas and Heating Company (Tenn.) is going after business in a big way despite the doings of TVA and EF and HA to promote the use of electricity for all domestic and commercial purposes in that neighborhood. To prove to the prospective user that gas is the ideal fuel for cooking and other purposes the Nashville company is letting their customers tell the story of gas for fuel in paid advertising space. As an illustration read what Chef Linkenhoker of the well known Sam Davis Hotel says—



Building the House Heating Load

(Continued from page 15)

job. A 6" x 9" envelope will answer the purpose nicely. This record is very valuable as time goes on in checking for various reasons that will develop with numerous jobs.

EXHIBIT 24

S. H. STOCK SHEET

TAG NO. .....

ARTICLE .....

STYLE .....SERIAL NO. .

ACCESSORIES .....

FROM .....

DATE .....C. O. NO. .

CONDITION OF APPL. .....

APPEARANCE .....

SOLD TO .....

REPRESENTATIVE .....

Used equipment record sheet.

Annual inspections, free gratis, should by all means be made. All valves should be numered and tagged with a metal tag and a complete instruction card fastened to the basement wall. All servicing should be given free and cheerfully, including turns-ons and turn-offs. The party who makes the original installation should instruct the customer thoroughly in the operation of the plant and then have the customer demonstrate his ability. The househeating salesman should also be competent to instruct in operation. The inspectors and service men should go through the same routine in every visit. This concentration on instruction to the customer will acquaint him with his equipment and relieve you of many future service calls.

Never try to explain how to turn on and off house heating equipment over the telephone. It is better to have a service man go out and demonstrate in the customer's presence.

It has been the custom in the past to set the burner to consume the amount of gas required to heat the house at a minimum outside temperature. This has been necessary as the installation has had provision for only this. The result has been what is known as a cold 70, which is caused by the stratification of air, due to long lags between the time when the thermostat shuts the gas off until the temperature drops to where it is turned on again. This condition occurs in medium weather and is due to the air not being in motion; thus the warm air rises to the ceiling and the cold air settles to the lower levels, while the breathing line may still be at the desired point.

This difficulty is being overcome in some localities by the installation of a two-stage demand. The Gas Service Company in Kansas City have devised a change in their thermostats and the installation of the second electric gas valve in the fuel line. This arrangement permits the gas to burn at a much lower rate than the maximum unless the minimum is actually required. This results in a material reduction in the lag between the previous on and off of the burner. It will tend to reduce the operating costs, and will make the temperature of the home more nearly uniform as the air is kept in motion more of the time.

For new installations there are now thermostats on the market designed specifically to anticipate the cold 70 condition. These new type thermostats automatically turn on the gas for a short period every thirty minutes. This reduction in the lag will do much toward the prevention of air stratification.

Where the installation has already been made and the customer cannot be sold on the cost of the change to the dual motor valve, it is possible to work out a manual control with a snap valve in the gas manifold and a chain running upstairs. This will permit the customer to burn a small amount of gas all the time and thus keep the air in motion. This would not be sufficient to keep the house warm, but the thermostat would take care of the deficiency. Of course, it would be up to the customer to anticipate his needs to operate such a manual control economically.

Office Assistance

In addition to the regular force of clerks and stenographers, there will have to be some one in the office who is well versed in house heating as well as meeting the public, for there will be numerous calls for information from various points of view. This party should have at hand an accumulative chart showing actual degree days for the existing season. While all estimates are made on averages covering a long period, still there will be months where there is a considerable fluctuation, and such a chart makes any specific gas bill easily explainable. For instance, here in Denver during the calendar month of December, 1932, we actually had 1,280 degree days, which represented an excess of 20% over and above normal. This resulted in numerous high bill complaints, but when the chart and actual conditions were shown the customer it was easy to satisfy him. While one month may vary materially, the year as a whole will average up quite well, and it is remarkable the degree of accuracy with which one can estimate the annual costs.

Card 16, a sample of which is shown below, is kept by the consumers ledger accounting department and is a complete record of the actual consumption and gas costs. This card is a great help in disposing of misunderstandings with the customer as to his costs. Very frequently he is under the impression that his heating is costing him far more than it actually is. One can always take this card and by adding the entire year and subtracting the domestic gas, show the actual cost of heating. This is commonly quite different from what the customer had in mind.

EXHIBIT 23

INSTRUCTIONS

For Operating Your Gas Heating Plant

There are three valves controlling the gas to your plant. These valves are identified by brass tags with valve name and number.

1. The small valve marked PILOT VALVE controls the pilot burner.
2. The large valve marked MAIN GAS VALVE controls the main burner.
3. The valve marked THERMOSTAT VALVE also controls the main burner when the MAIN GAS VALVE and ELECTRIC SWITCH are turned on.

TO LIGHT THE PLANT

FIRST	Make sure the pilot valve and main gas valve are closed and have been closed for at least 15 minutes. Also see that the electric switch is in the off position and that the fire door is open.
SECOND	Light the lighter tube or a roll of paper and place the flame to the pilot tip, then open the pilot valve. Make sure that all pilot tips are burning. Do not turn the pilot light lower than set by the inspector.
THIRD	Open the main gas valve.
FOURTH	Turn on the electric switch. The thermostat valve will open if the rooms are below the temperature set on the thermostat or will remain closed if the rooms are up to temperature. Close the fire door.

TO TURN OFF THE PLANT

FIRST	Turn off main gas valve.
SECOND	Turn off pilot valve.
THIRD	Turn off electric switch.

CAUTION

Watch the pilot lights. If the pilots are extinguished for any reason close the main gas valve, pilot valve and electric switch, wait 15 minutes, then follow above instructions to light the plant.

Pilot lights should not be turned out until after the main gas valve is closed. The water level of the boiler should be inspected daily and should be maintained according to the instructions furnished with the boiler. With steam air furnaces fill the vaporizer pan or humidifier with water as needed to meet the requirements of the house.

At the start of the heating season and at least once every week thereafter during the heating season, open the chimney clean-out and remove from the chimney flue any accumulation of soot or cinders. This is important and must not be neglected.

Do not attempt to adjust the thermostat since it can be very easily thrown out of adjustment.

Do not burn papers or trash in the furnace.

Inspect your heating plant daily during the heating season.

If adjustment is not right or the plant is not working satisfactorily, phone TAbor 1122, Investigation Department, and report specifically as a home heating complaint.

[redacted]

(This Meter/Tested on _____ 193__ By _____)

Form No. 9343 200-832

Technical Digest

GASIFICATION VALUES OF GAS AND COKING COALS

The cost of carbonizing the ash content of coal is discussed. The effect of the water content on the head required for carbonization, on the packing of the coal and on the ease of condensation of the gas is shown graphically. The absorption of oxygen by the coal increases with time of storage and has a great effect on its coking properties.

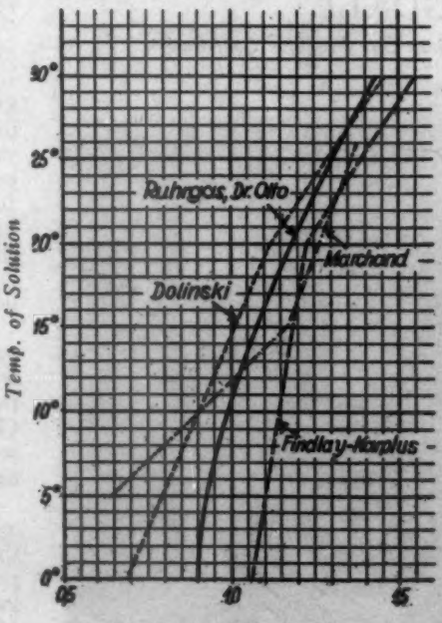
Methods for figuring the cost of coal based on this data are given. Figures are also given showing the effect of inert gases on the caloric value of the gas, and its connection with the necessary water-gas production. The average ratios of the value and production of coke as compared with the coal carbonized for a number of works are given, and the effect of the former on the relative cost of coal gas and water gas is discussed.

—K. Bunte, Gas-u, Wasserfach, 1934, vol. 77, p. 274-77.

DETERMINATION OF NAPHTHALENE IN GAS

The determination of naphthalene by picric acid depends on the temperature and concentration of the picric acid solution. Figures are given for the solubility of picric acid in water, and it is shown that as picric acid decreases or the temperature of the determination rises the amount of naphthalene recovered is less than the calculated value. Erroneous results are obtained by high temperatures of the picric acid solutions, even at 25° no precipitate was formed with gas of low naphthalene content. A new method of analysis was developed in which the gas is passed through two wash bottles each containing 100 cc of a 0.9% solution of picric acid and maintaining a temperature of not less than 4° nor higher than 7°.

The gas is passed at the rate of 1.75 cu ft. per hour until sufficient picrate has formed in the wash bottles. The picrate precipitate is filtered, sucked dry and the molecular compound of picric acid naphthalene is decomposed with hot water, after which the picric acid is titrated with tenth normal alkali. A correction should be made for picric acid clinging to the filter to the extent of a 0.3



G. Picric Acid/100 G. Water
Solubility of Picric Acid in Water.

cc deduction from the volume of the tenth normal solution required.

—H. Seebaum & W. Oppelt, Gas-und Wasserfach, 1934, vol. 77, p. 280-2.

STEAMING OF THE FREE SPACE IN HORIZONTAL RETORTS

Steam was introduced through a hole in the discharge and mouthpiece at a rate of 2% by weight per hour of the charge at 25 lb. per sq. in. at 103°. This led to a lowering of temperature of 50-60° of the last two feet of the retort and effected carbonization. Similar experiments were therefore carried out with steam superheated to 280° for the last 2 hours of carbonization, the free space in the retort being 45%. The tar obtained by this procedure had a higher density and pitch and free carbon content, and a large volume of gas of lower calorific was produced. No change in the sulfur and cyanogen contents was noticeable. Carbon deposit was greater at the charging end but less at the discharge end. Comparative results were then obtained on a test plant of stop-ended retorts with steaming for the last 1.5 hours. An increase of 1400 cu. ft. of gas per ton of coal carbonized with a drop in calorific value of 25 B. T. U. was obtained. The tar yield decreased, but the therms obtained per ton of coal increased by 5.6 therms.

—F. Boardman, J. H. Williams & L. L. Kleist. Gas Jour. London 1934, vol. 100, p. 566-9.

IMPROVEMENT OF WATER-GAS BY CARBURETTED OILS

The results of research work on the improvement of water-gas with carburetted oils are as follows:

The most suitable decomposition temperature in the super-heater is found to be 700-750°C., as this makes for the greatest improvement in the heating value of the carburetted oils. It is not advisable to raise the super-heating temperature materially above 750°C or let it drop under 700°C, because above or below these points the decomposition of the oil is unfavorable and the consumption of the oil rises. It is most important to obtain a careful oil distribution and a proper adjustment of the time for introduction of the oil. By means of a laboratory apparatus gas oils may be evaluated. One conducts experiments so that the rate of oil flow amounts to about 15 grams per hour and the temperature is maintained at 700-750°C.

It is advisable to carry out the decomposition in a stream of hydrogen gas passing at the rate of about 1¼ cu. ft. per hour. Comparison of the results obtained according to this procedure give a good indication of the value of oils for carburetting purposes. An examination of the oils should also include determination of the specific gravity, the boiling point, the hydrogen content and refractive index.

Good carburetting oils should not contain fractions boiling under 250°C. With oils having a similar boiling range preference should be given to the lighter oil. Oils for carburetting should be practically free from asphaltic material. A proposed evaluation as well as Holmes evaluation, both of which can be calculated on the basis of physico-chemical experiments, will give a good indication for the rapid approximate evaluation of carburetting oils.—

—P. Schlaepfer, Monatsbulletin, vol. XIV, *p.* 1-18, *Jan.*, 1934.

THE 'BROBDINGNAGIAN AND THE LILLIPUTIAN' OF GAS BOILERS

A Word-and-Picture Visit to the Century of Progress with

H. H. DUGDALE

General Manager of Sales, American Gas Products Corporation

GOOD showmanship has always depended to a great extent upon the judicial use of superlatives. Thus, millions of visitors at this year's Century of Progress Exposition are inspired by promises that they will be shown "the biggest," "the best," "the most modern," et cetera ad infinitum.

The American Gas Products Company has used to advantage this age-tested formula for capturing popular fancy in its exhibit of the LARGEST and the SMALLEST gas boilers in the world, a part of the display of the American Radiator & Standard Sanitary Corporation. Arranged against a photo mural background of radiator heated skyscrapers, as pictured above, the two boilers are contrasted vividly in size.

In practice, both units are completely automatic, equipped with mechanical controls so centralized that there is no dependence upon electrical or other power for operation—truly ALL-Gas. The larger boiler, for commercial and industrial use, as an AGA rating of 16,000 square feet of steam and 25,600 square feet of hot water, compared with 210 square feet of hot water for the smaller boiler which is designed for use in small homes, shops and stores. An important feature of the latter unit is that it can be placed on the same level with radiators, making it unnecessary to have a basement. Its firebox is entirely surrounded by water, so that it is perfectly safe if placed on a wooden floor. There are 40 burners in the larger boiler and one in the smaller boiler.

An intermediary unit, and the company's automatic storage water heaters are included in the display at the Fair.

Chas. A. Munroe Award

Under the leadership of A. J. Gonnoud, president and general manager of the Kings County Lighting Company, Brooklyn, New York, as chairman, members of the Charles A. Munroe Award Committee this year are making an intensive effort to arouse enthusiasm and stimulate competition among A.G.A. member companies for the honor of having some employee within one of their organizations win the distinction of receiving this coveted prize.

The Charles A. Munroe Award is presented annually to the individual who is judged to have made the greatest contribution to the advancement of the gas industry within the year. Such contributions cover all parts of the gas business and, therefore, give each employee, no matter in what capacity he may work, a chance to capture this award, which consists of $500, together with an honorary distinction.

It is hoped that all member companies will acquaint their personnel with the possibility of someone in their own company winning the Charles A. Munroe Award for 1934, stressing the honor which is far in excess of any monetary value.

In judging contributions, the committee will consider the following three factors—originality and completeness, scope of usefulness and value of contribution. Presentation of the award will be made at the annual convention of the American Gas Association.

The other members of the Charles A. Munroe Award Committee are H. L. Dickerson, Electric Bond & Share Company and Electric Corporation.

High Pressure Storage

(Continued from page 20)

tions have as numerous leaks as those which are subjected to the greatest amount of breathing action. If breathing action was the prime cause of leakage at seams and rivets there should be none on spheres as careful measurement on spheres of large diameter have failed to indicate any movement and yet numerous small leaks on riveted designs are common as shown in illustration No. 9.

The tank type either vertical or horizontal offers less difficulty during scraping or painting operations than spheres.

The major reasons for selecting either type are, therefore, costs and appearances, each having approximately the same operating disadvantages.

(Next installment in October issue)

EQUIPMENT NEWS

New Kennedy Valve

The Kennedy Valve Manufacturing Company, Elmira, N. Y., has placed on the market a new Heavy Standard Bronze Gate valve designed for 150 lb. working steam pressure and 250 lb. working water, oil or gas pressure.

One of the features of these new valves is the large bonnet hex which is placed close to the body to make the entire valve more rigid and also to assist easier removal of the bonnet and stem assembly when the valve is installed with close clearances.

Another feature is the design of the stem which is made of specially tough bronze, has an unusually large number of heavy contact threads, and has a flexible connection between the stem head and the disc, making stripping of threads almost impossible and prolonging the life of the valve. These valves are built in a complete range of sizes up to 3 in.

Control Trip Prevents Explosions

To guard against explosive mixtures of fuel and air when lighting off pulverized coal, gas or oil fired boilers, Bailey Meter Company, Cleveland, Ohio, has developed a control trip which withholds fuel feed until the boiler is thoroughly purged.

The mechanism consists essentially of two oil sealed bells suspended from a beam to measure Air Flow through the boiler. A draft connection from the right-hand bell to the boiler furnace, and a similar connection from the left-hand bell to the last pass provides for the use of draft loss through the boiler as a measurement of Air Flow.

Although this control device is provided with an indicating pointer for calibration and checking, its primary function is to operate the snap-acting contactor between the two oil-sealed bells. This contactor is connected to the Air Flow mechanism by linkage in such a manner that it is necessary to run the rate of Air Flow through the boiler up to approximately 60% of capacity before the contactor snaps closed and permits operation of the fuel feeder motor relay or control valve.

A New Lubricating Device

Joseph Dixon Crucible Co., Jersey City, N. J. have placed on the market the "Graf-Air Gun" which facilitates the use of microfyne graphite powder for all lubricating service.

The Graph-Air Gun, being made of rubber, when squeezed deposits the graphite where needed in measured amounts through positively controlled air pressure. The measured or graphite volume is largely controlled by the position of nozzle in relation to the dial on top of "Gun." The nozzle may be turned to a complete shut-off position making the "Gun" practical to carry in tool kits without spilling graphite.

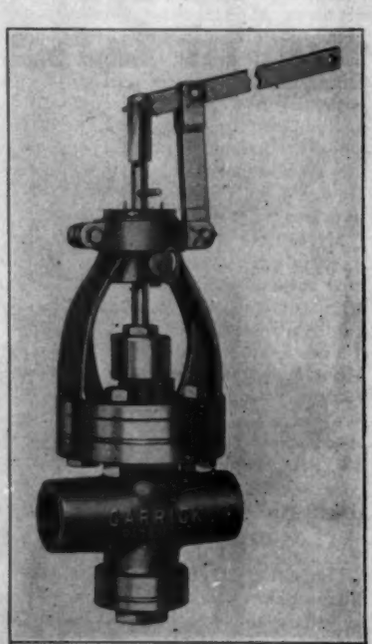
A plug fitted to the bottom of the "Gun" and easily snapped in and out, carries a disc of chamois for use as a burnisher.

The "Gun" comes filled, ready for use, but when necessary to refill, the "Gun" head may be quickly unscrewed, exposing a large opening through which is inserted the "easy-pour chute spout" which is attached to the refill cans of Microfyne Graphite.

The 2" nozzle is standard with each "Gun" but an 8" nozzle may be secured. Descriptive matter mailed on request.

Adjustable Flo-Trol Valve

Carrick Engineering Co., Michigan City, Mich., announce a new Carrick type adjustable flo-trol valve. The valve is automatically controlled by the Carrick Master Control. The lever of the valve is moved automatically to secure a variation of steam flow for speed control of the engine or turbine driving the stoker or fan. The manually adjustable feature of the valve makes it possible to secure the required range of speed to be effected by the movement of the valve lever. All adjustments can be made easily, while the valve is in service.



Steam passing through the valve does not come in contact with the valve seats, eliminating the effects of wire drawing. Although the valve is designed primarily for the control of steam it is entirely suitable for the control of other fluids, such as oil, gas or air.

Book on Testing and Qualification of Welders

The Linde Air Products Co. 30 E. 42 St. New York, have published a booklet titled "The Testing and Qualification of Welders." It lists six essential steps in every procedure control. 1st testing of welders before they start the work; 2nd selection of suitable material and welding rod; 3rd correct design and layout of joints; 4th correct preparation and assembly for welding; 5th checking to see that the welding is done correctly and economically; 6th inspection and testing to make sure that all the steps of the procedure control have been executed. The purpose of the booklet is to outline simple tests for measuring the ability of welders. The booklet contains 22 pages and is freely illustrated.

NEWS of the GAS INDUSTRY

Chas. W. Person Appointed Director of Publicity and Advertising

Charles W. Person has been appointed Director of Publicity and Advertising at American Gas Association Headquarters, according to announcement by Alexander Forward, Managing Director. Mr. Person will work closely with the newly created General Committee on Publicity and Advertising, whose Chairman, Mr. Henry Obermeyer, Consolidated Gas Company of New York, is a member of the Executive Board.

Mr. Person was formerly with the Association for a number of years and now returns to it. He is well known to all advertising and publicity men in the public utilities field.

The American Gas Association Monthly will be edited under Mr. Person's direction by James M. Beall, for five years a member of the Association's Headquarters Staff.

Domestic Gas Used to Inflate Five Balloons

Domestic gas from the mains of the Birmingham Gas Company was used to inflate the five balloons which competed in the National Balloon Races recently held in Birmingham, Alabama. The races, held as an elimination contest to pick America's entry for the Gordon Bennett Cup race this Fall, was sponsored as a civic enterprise for the benefit of Birmingham's Crippled Children's Clinic and attracted thousands of spectators. The Navy's entry won the race.

The problem of conveying gas to the balloons was solved by tapping the Birmingham Gas Company main at the stadium entrance and running a 10" Mono-Cast Doublex Simplex cast iron pipe line on top of the ground down the length of the field. Gas was fed to the balloons through staggered "services" to which was attached gas-tight cloth tubes.

Gas was donated by the Birmingham Gas Company, and the pipe line by the American Cast Iron Pipe Company.

Profit-Making Barred to Municipal Utilities in New York State

The New York Public Service Commission has ruled that municipally operated utility plants are not entitled to earn a profit on their operations but must fix rates at a level merely sufficient to produce sufficient revenue to cover the cost of service.

The opinion was given in a proceeding brought by consumers against the municipal plant of Boonville. Because of the wide bearing of the case, several villages and the Municipal Electric Utilities Association intervened. The argument of the association was presented by Dean Paul Shipman Andrews, of Syracuse University. He contended that the commission was bound to fix a rate for municipal plants sufficient to yield a fair return on the fair value of the property.

The commission held, however, that municipal plants should be operated to give the residents of the community service at the lowest possible rate. Wherever a profit was realized, the commission argued, the excess earnings were in effect a form of indirect taxation on the subscribers. Taxpayers should not suffer increased burdens to supply electricity to non-taxpayers, the commission ruled.

Wants Its Own Gas Plant

The city council of Oklahoma City agreed that the city should own its own gas plant, and on October 2 the voters will be asked to approve a $4,000,000 bond issue, the money to be used for the realization of the plant.

Indianapolis, Ind., Asks for Bids to Supply Capital to Take Over Citizens Gas Co.

An invitation to submit bids for supplying the capital necessary to enable it to acquire the Citizens Gas Company has been extended by the city of Indianapolis through its utility department, which announces that such offers will be received to Sept. 4. The invitation sets out the following requirements: "Any proposition must specify a low interest rate; reasonable sinking fund requirements and maturity date. permission for exchange of revenue bonds of the utility department for outstanding stock and bonds of the company; financial ability of the bidder, and satisfactory assurances of noncollusion with other bidders, actual or prospective, and whether the bidder is interested in any proposition made or to be made for supplying natural gas to the city. Later there will be formal proposals for sale of bonds, as required by law."

Simultaneously with the invitation for proposals, the trustees and directors of the utility department made public a statement reviewing the difficulties heretofore encountered in financing the acquisition of the property and announcing the present determination to close it. Eventually, it was said, they expect to supply natural gas to manufacturers and mixed gas to other consumers.

Convention Calendar

September

1-4 International Gas Association, Zurich, Switzerland.

9-14 American Chemical Society Division of Gas and Fuel Chemistry, Fall meeting, Cleveland, Ohio.

11-13 Pacific Coast Gas Association, annual convention, Hotel Del Monte, Del Monte, Calif. Clifford Johnstone, managing director.

October

Week of 29th—American Gas Association Convention and Exhibition, Atlantic City, N. J.

Jury Decides for Lone Star Gas Company in Gate Rate Case

One of the most important and far-reaching of recent utility rate cases was decided by a jury in the 53rd District Court of Texas at Austin July 21. The action of the Texas Commission in ordering a reduction from 40c per thousand cubic feet to 32c for natural gas delivered wholesale by the Lone Star Gas Company at the borders of towns for local distribution, was disapproved by this verdict. The decision affects approximately 250 cities and towns in Texas.

The verdict upholds the company's contention that the gate rates fixed by the Texas Commission are unreasonable and unjust. The company valued its properties at $70,000,000 and the Commission's engineers at $40,000,000. The company filed an exhibit showing that on the Commission's own valuation the company could not earn the rate of return allowed by the Commission, 6%. The State gave notice of appeal.

The fact that this judgment was rendered by a jury in a State court is hailed by President Denning of the Lone Star Gas Company as notice to the investing public that in Texas honestly invested capital honestly managed will be protected against partisan political attacks.

Nashville, Tenn., Cuts Gas Rate

The Nashville Gas & Heating Co. has filed a new rate schedule with the Tennessee Utilities Commission which will lower gas rates in this city from 15 to 40 per cent, effective Sept. 1. The cut in rates was voluntary on the part of the gas company.

Samuel E. Linton, president of the company, stated that the new rate schedule eliminates the $1 charge for the first 100 cu. ft., and gives 714 cu. ft. for $1, or 614 per cent more gas. Formerly 700 cu. ft. of gas cost the consumer $1.75, but under the new rate this amount will cost 98 cents.

AMERICAN GAS CONVERTOR

Engineered especially for the 1,000,000 ARCO ROUND BOILERS *in use*

ALSO FITS ANY ROUND TYPE BOILER OR FURNACE

Now ready for delivery.

- Pilot gas supply line has individual gas pressure governor insuring constant strength of pilot flame
- Throttling control valve for steam, water or warm air jobs
- Secondary air control, opening in advance of admittance of gas to burner
- [illegible] for boilers or furnaces
- *All controls mechanical in operation* and centered in one main gas control valve
- Air duct closely coupled to boiler or furnace. *Does not protrude into basement*
- Raised port, drilled burner
- Silent in operation
- Compact; sturdily constructed; easily installed
- For use in any make round type boiler or furnace. Special baffling and plate work equipment make it a "tailor made" job for Arco Round Boilers

Note compactness of installation.

FOR DISTRIBUTION IN MANUFACTURED GAS TERRITORIES

AMERICAN GAS PRODUCTS CORPORATION

Division of AMERICAN RADIATOR COMPANY

40 West 40th Street, New York, N. Y.

Denver Standby Plant Supplies City During Pipeline Interruption

Following a break in the pipeline of the Colorado Interstate Gas Company fifty miles south of Denver, Colorado, on the afternoon of July 26, the Refractory Screen Oil Process equipment of the Denver plant was put into service supplying the demands of the city for a seven hour period.

Robert H. Taylor, Gas Engineer, Public Service Co. of Colo. stated that the break occurred at 2:00 p.m. at a point on the Amarillo-Denver line six miles east of Colorado Springs and was caused by a local rain that flooded Sand Creek, tearing the line from its normally dry bed. Colorado Interstate crews from Colorado Springs and La Junta began repair work as soon as the flood waters receded, installing bull plugs and 1,500 feet of 6" by-pass. Temporary repairs were completed and the gas flow resumed at 3:30 p.m., July 27, twenty-five and one-half hours later.

No interruption in customer service occurred during this period. Pipeline pack was utilized during the night of July 26. To insure adequate supply for the Colorado-Wyoming Gas Company's line, serving several towns in northern Colorado and Cheyenne, Wyoming, the Denver standby plant was placed in operation at 10:00 a.m., Friday, July 27.

Plant improvements completed last Spring, including a 1,000-g.p.m. well and increased cooling capacity, made it possible to care for the load of 300,000 cubic feet per hour without approaching plant capacity.

The Colorado Interstate Gas Company plans to install 3,000-pound river clamps at 20-foot intervals through the danger zone.

A.G.A. Nominating Committee Reports for 1934-1935

In compliance with Section 2 of Article II of the By-Laws of the American Gas Association, announcement is hereby made to the membership of the following recommendations of the General Nominating Committee which they will report to the annual convention in Atlantic City, N. J., in October, 1934:

For President—P. S. Young, V. P., Public Service Electric and Gas Company, Newark, N. J.

For Vice-President—L. B. Denning, Pres., Lone Star Gas Company, Dallas, Texas.

For Treasurer—William J. Welsh, Pres. & Genl. Mgr., New York and Richmond Gas Co., Staten Island, N. Y.

For Directors—Two-Year Terms:

Addison B. Day, Pres. & Gen. Mgr., Los Angeles Gas and Elec. Corp., Los Angeles, Calif.

B. J. Denman, V. P. & Gen. Mgr., The United Light and Power Co., Chicago, Ill.

Henry L. Doherty, Pres., H. L. Doherty & Co., New York, N. Y.

O. H. Fogg, V. P., Consolidated Gas Co. of N. Y., New York, N. Y.

Arthur Hewitt, V. P. & Gen. Mgr., Consumers Gas Co. of Toronto, Toronto, Ontario.

N. C. McGowen, Pres., United Gas Public Service Co., Houston, Texas.

Wm. T. Rasch, Pres., American Gas Products Corp., New York, N. Y.

Thos. E. Roach, V. P. & Gen. Mgr., Washington Gas and Elec. Co., Tacoma, Wash.

W. Frank Roberts, Pres., Standard Gas Equipment Corp., Baltimore, Md.

Respectfully submitted, W. B. Tuttle, Chairman; William C. Bell, H. C. Blackwell, H. L. Dickerson, Donald McDonald, James L. Stone, Nominating Committee.

The following members have been nominated by Section Nominating Committees to serve as section officers for the next Association year:

Natural Gas Department: For Chairman—John B. Tonkin, Pres., The Peoples Natural Gas Co., Pittsburgh, Pa.; for Vice-Chairman—William Moeller, Jr., V. P., Southern California Gas Co., Los Angeles, Calif.

Accounting Section: For Chairman—A. S. Corson, Gen. Auditor, The United Gas Improvement Co., Philadelphia, Pa.; for Vice-Chairman—F. L. Griffith, V. P., The Peoples Gas Light and Coke Co., Chicago, Ill.

Commercial Section: For Chairman—F. M. Rosenkrans, New Business Manager, Gas Service Co., Kansas City, Mo.; for Vice-Chairman—C. E. Bennett, Pres., Binghamton Gas Works, Binghamton, N. Y.

Industrial Gas Section: For Chairman—J. F. Quinn, Supervisor Industrial Gas Sales, The Brooklyn Union Gas Co., Brooklyn, N. Y.; for Vice-Chairman—C. W. Gale, Supt. Commercial and Industrial Gas Departments, Public Service Co. of Colorado, Denver, Colo.

Manufacturers' Section: For Chairman—John A. Fry, V. P. & Secy., Detroit-Michigan Stove Co., Detroit, Mich.; for Vice-Chairman, Apparatus Division—Merrill N. Davis, V. P. in Charge of Sales, S. R. Dresser Manufacturing Co., Bradford, Pa.; for Vice-Chairman, Appliance Division—J. Scott Fowler, Pres., Lovekin Water Heater Co., Philadelphia, Pa.

Technical Section: For Chairman—C. A. Harrison, Gas Engr., H. L. Doherty & Co., New York, N. Y.; for Vice-Chairman—F. A. Lydecker, Gen. Supt. of Gas Distribution, Public Service Electric & Gas Co., Newark, N. J.

House Heating Campaign in Birmingham, Ala.

The Birmingham Gas Company of Birmingham, Ala., is pushing a Summer home heating campaign. The latest move is to guarantee that the bill for winter heating will not run more than 10 per cent above a fixed figure. This is the first time the company has taken such a step which has met with a ready response. It has done much to break down the sales resistance of the

GASO SAYS

"It makes me smile when I hear people talk about the gas-company monopoly."

Just an excerpt from the dialogue in this highly entertaining and enlightening allegory of the services so close to every Gas-Man's heart . . .as:

GASO . . . WATTSO . . . and WASHO with the help of The TELEPHONE TALK ABOUT the dollars and cents these servants receive . . .

"THE THREE LITTLE METERS AND THE TELEPHONE"

by A. J. Wager and R. A. Aschenbrener

This booklet can be utilized as an effective mailing piece to stockholders and customers.

SPECIAL OFFER

in quantity lots . . . For YOUR personal copy, SEND 25c in stamps to:

DOUBLEDAY, DORAN & COMPANY., Inc.
244 Madison Ave., New York City

We Guarantee
YOUR GAS BILL
ESTIMATE
FOR HOME HEATING

In order that you may know the Economy of gas heat in your home, we have arranged to guarantee our engineer's estimate of operating cost for the first year while you are trying automatic gas heat.

Before we install your gas conversion burner, we will give you an estimate of the probable operating cost and a guarantee that the maximum operation cost for the first year will not exceed it more than 10%.

If you thing a low estimate of operating cost is made in order to induce you to install gas heat, how do you think we could afford to make such a guarantee? Hundreds of Birmingham homes are now enjoying the benefits of automatic gas heat—and very economically, too. We'd be glad to furnish further details.

RENT AN AUTOMATIC GAS BURNER
$3.50 Per Month During Heating Season

You can now rent an automatic gas conversion burner for your furnace or boiler. You pay $3.50 [illegible] rental at $3.50 per month for the seven heating months only. Any time you are not satisfied with the comfort, convenience, cleanliness and economy of gas heat in YOUR HOME, we will take the rented burner out and put your furnace or boiler back in the same shape we found it. You RISK NOTHING. Contact the nearest [illegible] in typing gas heat this winter. Telephone our Home Heating Department, or come by our office for further information.

BIRMINGHAM GAS COMPANY

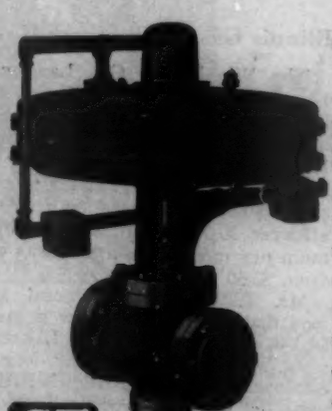
Bessemer Birmingham Ensley

SUPERIOR

Gas Meters
Provers
Service Cleaners
Diaphragms
Repairs

SUPERIOR METER CO.
167-41st Street
Brooklyn, N. Y.

Atmospheric Pressure Can Be Maintained at All Times



Fulton Duplex Vacuum Regulator

ON a system discharging gas to a line under light pressure, the Fulton Duplex Vacuum Regulator will definitely prevent the pulling of a vacuum and will maintain atmospheric pressure at all times. When pressure in the storage tank falls, the valve closes. This is a valuable safeguard. Full description and prices will be mailed on request.

The Chaplin-Fulton Manufacturing Co.
28-40 Penn Avenue Pittsburgh, Pa.

Representatives:
WESTCOTT & GREIS, Inc., *Sales and Service*, Dallas and Tulsa
C. H. COLLINS, 628 Dwight Bldg., Kansas City, Mo.
HIMELBLAU, BYFIELD & CO., 228 N. LaSalle St., Chicago, Ill.
or Any Jobber

"We use **CHACE** *Exclusively*
FOR AUTOMATIC OVEN LIGHTER CONTROL"

DETROIT VAPOR STOVE CO.

Chace Bimetal is the active element in many oven thermostats on both gas and electric ranges. Installed within the oven chamber Chace Bimetal responds to the slightest change in temperature and by its bending movement controls the fuel supply, thereby maintaining oven temperature at any desired range.

Chace Bimetals are now available to operate in temperatures as high as 1200° F. or as low as 50° F. below zero. Sold in:

SHEETS • STRIPS • FORMS

CHACE THERMOSTATIC BIMETAL

W. M. CHACE VALVE CO.

prospect for gas heating who held back in fear the monthly bill would be excessive.

The company is acting under the assumption that after a customer tries out a conversion burner for one year he will be so satisfied with the convenience and cleanliness of this type of heating that he would not consider going back to a coal fired furnace. For that reason the company is also offering to rent conversion burners for a down payment of $5 and $3.50 per month during the seven heating months.

Pawtucket Gas Co. Cuts Gas Heating Rate

The Pawtucket Gas Co., Pawtucket, R. I., has made the fourth reduction in their gas heating rate, effective August 4th.

The new rate is for gas used for heating buildings, but gas for cooking, and for heating water in buildings heated by gas may also be taken under this rate, provided the amount of gas used for building heating is at least one-half of the total yearly use.

The rate is based on No. 3 fuel oil priced at seven cents per gallon and is as follows:

First 1000 cu. ft. per month @ 17c per 100 cu. ft. net.

Next 2000 cu. ft. per month @ 13c per 100 cu. ft. net.

Next 297,000 cu. ft. per month @ 5.2c per 100 cu. ft. net.

All over 300,000 cu. ft. per month @ 4.7c per 100 cu. ft. net.

The rate is subject to fluctuation in proportion to the fuel oil price. Also, from Sept. 1 to July 1, a minimum of not less than $50 is required.

INDUSTRIAL
GAS BOILERS

ASME CODE
TUBULAR & FLUELESS

Sizes from one half to thirty horsepower. 100 lb. boilers in stock. Higher pressures to order.

Automatic Gas Controls
Low Water Gas Cut-offs
Boiler Feed Systems

P. M. LATTNER MFG. COMPANY
CEDAR RAPIDS, IOWA

Gas Company Helps Celebrate 150th Anniversary of Norwich, Conn.

Norwich, Conn., celebrated its 150th anniversary in July. The gas department of the city built a float for the street parade on which was reproduced

in miniature the entire plant of the city of Norwich Gas and Electrical Department. Gas holders and other buildings were shown complete, and all were surmounted by a bronze figure in striding posture, symbolizing 30 years of progress. The entire exhibit was mounted on a platform trailer and pulled by a roadster.

Gas Companies Gain 360,000 Customers First Half Year

On June 30, the number of domestic customers served by manufactured and natural gas companies totalled 14,751,600, as announced by Paul Ryan, Chief Statistician of the American Gas Association. This was an increase of 360,000 domestic customers during the six months interval.

This gain in customers is reflected in the fact that a total of 425,000 gas ranges were sold in the country during the first half of 1934. This was an increase of 42 per cent in range sales over the first six months of 1933. Approximately 70 per cent of such sales consisted of relatively high priced ranges incorporating modern automatic features, such as oven-heat control, etc.

Members of New A.G.A. Publicity and Advertising Committee

Members of the recently created Publicity and Advertising Committee of the American Gas Association, announced by Managing Director Forward, are:

Henry Obermeyer, assistant to the vice president, Consolidated Gas Company of New York, Chairman; Kenneth Magers, publicity manager, The Union Gas and Electric Company, Cincinnati. R. S. McCarty, manager, advertising department, Philadelphia Company, Pittsburgh; H. W. Olcott, Jr., advertising manager, The Philadelphia Gas Works Co., Philadelphia; D. D. Parry, advertising manager, Central Hudson Gas and Electric Corp., Poughkeepsie, N. Y., and William Reynolds, advertising manager, Electrolux, Inc. New York.

As chairman of the committee, Mr. Obermeyer automatically becomes a member of the Executive Board of the Association.

Troy, Ala., Completing New Butane Gas Plant

On completion of its new butane gas plant and distribution system, approved by the Public Works Administration, Troy, Ala., will be the only city in Alabama with both municipally-owned gas and electricity system.

The gas distribution mains are being built with the aid of a $68,400 loan from the PWA, including a 30 per cent grant by the government.

The butane gas will be purchased under contract in liquid form and shipped into Troy in tank cars. Under pressure, it will be forced into mains in gas form. Engineers estimate that there will be approximately 470 consumers.

Gas Company to the Fore

During late July business men of San Diego, California discussed the opening in that city of the California-Pacific exposition, on April 1, 1935. At the first meeting more than $300,000 was subscribed, the San Diego Gas & Electrical Company agreeing to donate $50,000.

Illinois Gas Co. Reduces Gas Rate

The Illinois Gas Co., Lawrenceville, Ill., serving gas to Lawrenceville, Bridgeport, Sumner and Olney, announced a new gas rate, effective July 19, 1934. First 2500 cu. ft. per month $1.40, next 2500 cu. ft. $1.00, next 5000 cu. ft. $0.80, next 20,000 cu. ft. $0.60 and all over 30,000 cu. ft. $0.50. The minimum per month per meter was reduced from $3.50 to $3.00.

Mr. T. W. Logan, General Manager says that this company now is starting a $4,000 improvement at the Lawrenceville plant, and the work is being done by unemployed gas users, allowing them to work out their gas account six months in advance. Gas customers increased by 140 this year. The company has also carried on a successful gas appliance campaign.

Gas Company Moves Office

The Peoples Natural Gas Co., Forest City, Iowa, has established new offices in the Odd Fellows building, with Timothy H. Bates, Tecumseh, Neb., as manager, succeeding Thomas Rice, resigned.

All sizes up to 3,400 cu. ft. capacity

Meters
Diaphragms
Repairs
Provers
Pumps
Calorimeters
Wet Meters
Gauges
Apparatus

METER REPAIR PARTS

FOR

ALL MAKES - ALL SIZES OF METERS

LARGEST GAS COMPANIES NOW
USING OUR PARTS

SEND FOR OUR CIRCULAR ON METER REPAIR PARTS

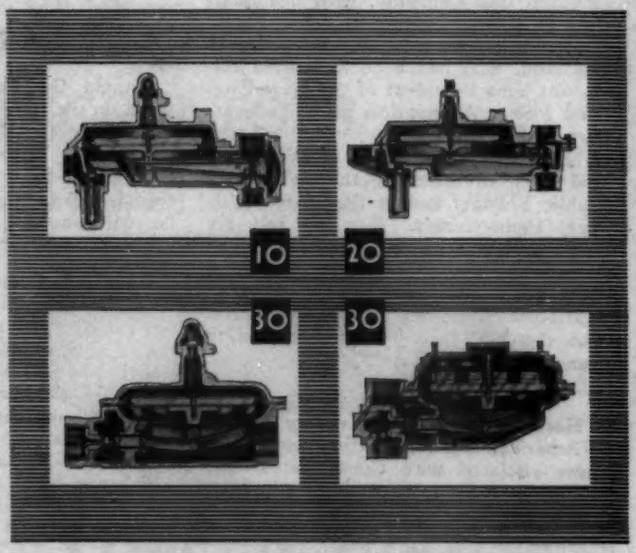
SAMPLES AND PRICES
GLADLY SENT

—•—

LAMBERT METER CO.

BUSH TERM. BLDG. 4, BROOKLYN, N. Y.

know! before hand



Illustrated, Cross-sectional views of: Models 10, 20 and 30. Model 30 is shown in spring and dead weight.

KNOW BEFORE HAND what type of Service Regulator will best meet the requirements of the installation, and operating efficiency will increase and upkeep cost will decrease.

REYNOLDS Service Regulators, Models 10, 20 and 30, are built to meet specific requirements —years of operation in the field, through a complete range of operation demands, have proved their superiority.

Write for complete details. Reynolds Engineering Department gladly co-operates in working out Gas Control Problems.

Reynolds Branch Offices:
421 Dwight Bldg.
Kansas City, Missouri
2nd Unit, Sante Fe Bldg.
Dallas, Texas

Representatives:
Eastern Appliance Co.
Boston, Mass.
F. E. Newberry
Avon, New Jersey
G. H. Unkefer
428 Boyd St.
Los Angeles, Calif.

MODEL 10—*Dead Weight or Spring Type,* with or without Mercury Seal, or Dead Weight Safety Seal. All working parts are so accessible as to be interchangeable without removal from pipe line.

MODEL 20—*Dead Weight or Spring Type,* with or without Mercury Seal, or Dead Weight Safety Seal. All working parts are so accurate as to permit complete interchangeability in shop.

MODEL 30—*For horizontal or vertical connections,* with or without removable valve pocket. Available with either Spring or Dead Weight adjustment. With or without Mercury or Dead Weight Safety Seal.

REYNOLDS GAS REGULATOR CO.

ANDERSON, INDIANA, U. S. A.

GAS CONTROL SINCE 189[illegible]

Feel at Home in CHICAGO

Stay in the TOWER of HOSPITALITY

•

From the Morrison tower you look down on the "busiest corner in the world"; but high up in the quiet, homelike rooms you are far away from noise and hurry. Deep, soft beds bring sound sleep. No other Chicago hotel gives as much at such reasonable rates.

In the Heart of the Loop **Fine Garage Facilities**

•

Only $2.50 up with Bath **Home of Terrace Garden**

MORRISON HOTEL

LEONARD HICKS
Managing Director

Personals

Thomas J. Hickey recently became Manager of Marlborough Electric Company and Manager of Marlborough-Hudson Gas Company, with headquarters in Marlborough.

Mr. Hickey succeeds Mr. R. H. Jameson, who has been appointed Assistant Vice-President of the New England Power Association with headquarters in Boston.

Mr. Hickey is a native of Worcester and was educated in the Worcester Public Schools and at St. Mary's College, Pennsylvania. For the last six years he has been employed in various companies associated with the New England Power system. He went to Marlborough in 1930 as sales manager. For the last year he has been acting manager.

Herbert A. Ehrmann, widely known in American Gas Association circles, became affiliated with Consolidated Gas Company of New York on July 1, 1934.

Mr. Ehrmann started with The Peoples Gas Light and Coke Company of Chicago in 1907. Fifteen years later he became assistant comptroller and then treasurer of the Midland United Company and Midland Utilities Company, two investment organizations controlling utility companies supplying over 800 communities in Indiana, Ohio, Michigan and Illinois, with gas, electric, water, heat, ice, motor coach or railway services. He held the post of treasurer of the West Ohio Gas Co. and the Chicago South Shore and South Bend Railroad.

While with the Midland group, he was instrumental in initiation of procedures involving management policies and accounting control.

High spots of his Association work include the chairmanship of the committee that worked up the alphabetical and classified list of office equipment machine manufacturers. He is also active in various phases of accounting section work.

Mr. Ehrmann received his education in Chicago grammar and high schools, and also at the Northwestern University School of Commerce.

C. N. Robinson was recently appointed vice-president in charge of new business of the Public Service Company of Oklahoma, Tulsa, Okla. Mr. Robinson has been connected with the Insull properties for 14 years, and comes direct to the Oklahoma utility from the Central Illinois Public Service Co. of Springfield, Ill.

A. M. Slattery, formerly with the Hoffman Heater Co. has joined the staff of the General Gas Light Co. and will have charge of sales in New England with Boston as headquarters.

McMurray Ridley was recently appointed assistant to Commercial Manager, William E. Leverette of The Nashville Gas and Heating Company, Nashville, Tenn.

Mr. Ridley who has been connected with the gas company for the past 12 years, will have direct charge of all contact work between the company and independent dealers in gas appliances, plumbers, architects and builders, and other wholesale outlets.

Ronald G. Sims, for the past three years on the office staff of the Associated Gas & Electric System branch at Fredericton, N. B., where this unit covers both gas and electric activities, has been transferred to Bridgetown, N. S., where he will succeed Clarence Troop, accountant, who was drowned.

George B. Cortelyou, president of the Consolidated Gas Co., has been named chairman of the advisory committee of the American Standards Association, which was organized 16 years ago as the national clearing house for technical standards developed by five engineering societies. Today it has a membership of 47 national organizations, which are trade associations, technical societies and Federal Government agencies. It has 1233 company members.

George W. Brinkley, manager at El Reno, Okla., for the Oklahoma Natural Gas Co., of Tulsa, has been transferred to the same post at Ardmore as of August 1. For many years prior to 1931, Brinkley served the company as assistant office manager in Tulsa.

H. M. Bradford, former salesman at Greenville, Texas, has been made supervisor of sales in the eastern section of the Community Natural Gas Co.'s territory. He has been in the company's employ for the past six years.

P. C. G. A. Names Officers For Coming Year

The Pacific Coast Gas Association nominating committee has placed the following names in nomination to serve for the year beginning with the annual convention in September:

For president—Wm. Moeller, Jr., vice-president in charge of natural gas production and transmission, Southern California Gas Co., Los Angeles.

For vice-president—H. M. Crawford, general sales manager, Pacific Gas and Electric Co., San Francisco.

For treasurer—D. G. Martin, auditor, Pacific Gas and Electric Co., San Francisco.

For directors (2-year term)—H. L. Farrar, Coast Counties Gas and Electric Co., Santa Cruz; W. J. Bailey, president Day and Night Water Heater Co., Ltd., Monrovia; Norman R. McKee, vice-president in charge of public relations, Southern Counties Gas Co., Los Angeles; and Thos. E. Roach, general manager, Washington Gas and Electric Co., Tacoma.

For director (1-year term)—B. H. Parkinson, Portland Gas and Coke Co.

Obituary

JOHN FABER HANST

John Faber Hanst, a consulting mining engineer and writer of technical articles and short stories, died Thursday at the Post-Graduate Hospital, New York after a short illness. He was forty-eight years old.

Mr. Hanst, a resident of Crestwood, N. Y., for many years, was born in Wilkes-Barre, Pa., and passed his boyhood in Kingwood, W. Va., and in Philadelphia. He was graduated from Lehigh University in 1907. He started his engineering career in the iron fields of Northern Michigan with the Cleveland Cliffs Iron Co. and later was with the Andes Copper Mining Co. of Chile and the Cortes Mining Co. of Mexico. At his death he was a consultant for the Chicago Pneumatic Tool Co.

He was a member of Phi Beta Kappa, Tau Beta Pi and Phi Delta Theta, the American Institute of Mining and Metallurgical Engineers, the Western Pennsylvania Society of Engineers, the National Geographic Society and the Masons. Surviving are his wife, two daughters, a sister and five brothers.

BOOK REVIEW

1934 Edition Engineers' Guide

The American Society of Heating and Ventilating Engineers' Guide. 1934 Edition. 846 pages; profusely illustrated; $5.00 per copy; published by American Society of Heating and Ventilating Engineers, 51 Madison Ave., New York, N. Y.

This 12th edition of The Guide contains the largest available information on engineering design and practice, as well as descriptions of the most modern equipment that manufacturers have produced.

The Guide has been carefully edited and indexed and contains reliable information in compact and usable form for reference. It is quite up to the high standard set by previous editions.

STANDARDIZE

on

SPRAGUE
CAST IRON GAS METERS

and

REGULATORS

for

low, medium, and high pressures

Accurate in Measurement.
Economical in Service.

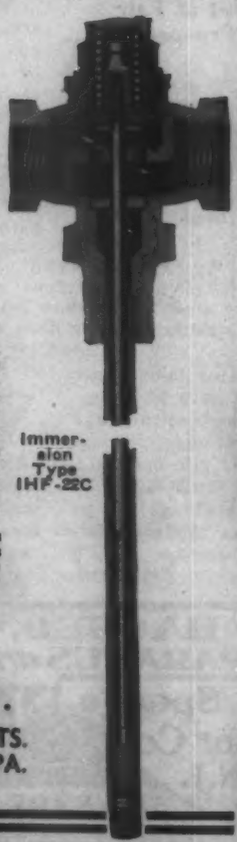
THE SPRAGUE METER CO.

BRIDGEPORT, CONN.

The "Defender"

A LOVEKIN EMERGENCY GAS SHUT-OFF VALVE designed to prevent the possibility of explosions and resultant damages on all types of

Automatic
Gas Water Heaters



Immersion Type IHF-22C

Embodying the Patented Lovekin Principle of actuation upon the softening of a Fuse (similar to that used in the well-known Automatic-Fire Sprinkler Systems), these Valves are designed for protection against dangerous overheating. The Fusible Element is enclosed in a cartridge, which not only "protects" the Fuse from contact with the water or other conditions which might affect its operation, but permits proper and easy re-servicing.

The general principle of operation is very simple; i. e., when the water is overheated to a danger point, the Fuse softens, causing the Gas Valve to snap shut.

Approved by many Gas Companies
Write for Literature and Data

KITSON CO.

WESTMORELAND & STOKLEY STS.
PHILADELPHIA PA.

Address Dept. "G"

HIGH PRESSURE **GAS HOLDERS** LOW PRESSURE

PURIFIERS · TANKS · CONDENSERS
STEEL PLATE CONSTRUCTION

INTEGRITY GOOD WORKMANSHIP FAIR DEALING

CRUSE-KEMPER CO.

AMBLER, PA.

TRADE NEWS

New Eastman Catalog

Eastman Mfg. Co. Manitowoc, Wis., recently issued Catalog No. 34-G covering the complete line of Eastman gas fitting. Practically all items are illustrated and priced. Copy will be mailed on request.

Gas Analysis Manual

The Fisher Scientific Company of Pittsburgh, Pa., recently issued a sixty-four page booklet entitled the Fisher Gas Analysis Manual, by Maryan P. Matuszak.

In the introduction the author explains the purpose of the manual as four-fold.

(1) to give directions for assembling various gas-analysis apparatus of the Orsat type; (2) to furnish complete but brief and concise directions for making gas analyses to operators who have not had previous training in this type of work; (3) to present some new time-saving technique to operators already familiar with gas analysis and (4) to inform gas analysts of some recent developments in modern gas-analysis equipment.

"You Name It" Contest

Geo. D. Roper Corp., Rockford, Ill., sponsored a "You Name It" sale and contest from February 1st to July 1st. The idea of the contest was to get the public into the display room of the gas company. Salesmen in their calls invited the prospective customer to call and see the models displayed. An entry blank was furnished and the prospect requested to suggest a name for the new range. On the back of the blank was space for a twenty-word statement giving the reaction of the contestant to the new Roper range.

Roper Corporation states that 30,000 people came to the display rooms of their customers, witnessed a demonstration and filled out the blanks. Mats were furnished for advertising the contest.

The prizes awarded were: First, $200.00; Second, $100.00; Third, $75.00; Fourth, $50.00; Fifth, $25.00 and ten $5.00 prizes.

Large Addition To Plant of W. M. Chace Valve Company

Our new addition is now finished—19,000 square feet of floor space, twice the former capacity!

More and more manufacturers are turning to Chace Thermostatic Bimetal to assure dependable automatic operation and control in their products. This swiftly growing demand overtaxed the capacity of our former plant.

But now, as business recovery progresses, the W. M. Chace Valve Company is well equipped to handle a large volume of Thermostatic Bimetal orders and handle them promptly.

Electrolux Exhibit at Fair Develops Sales Prospects

Thousands of prospects for the sale of gas refrigerators are being developed at this year's Electrolux exhibit at the Chicago Century of Progress exposition which is attracting an average of 1,000 visitors a day, according to information received at the eastern headquarters of Electrolux Refrigerator Sales, Inc., 51 East 42nd Street, New York City. Visitors to this year's Electrolux exhibit during the first three months of the Fair were twice as many as those of the same period in 1933.

Exceptional facilities for taking care of callers at the exhibit have been provided by Electrolux in view of the large demand for demonstrations. Several models are kept constantly in operation with specially trained attendants on hand to illustrate the workings and to show the advantages of the gas-operated refrigerator. An average of 250 demonstrations a day have been made since the Fair opened.

The Electrolux exhibit has a unique personnel set-up, the staff of demonstrators being composed of seven young college men specially chosen because of their interest and enthusiasm for Electrolux. Under the guidance of an experienced Electrolux salesman in charge of exhibit, the staff meets several times a week to discuss the best ways of holding the interest of callers.

The reception and handling of visitors are systematic as well as courteous, the inquiries having resulted in the furnishing of names and addresses which are later made available for sales prospect use by the Electrolux factory at Evansville, Indiana.

Visitors at the Electrolux exhibit this year indicate a much greater interest in learning about gas refrigeration than those of a year ago. This new attitude is attributed to the extensive advertising campaigns carried on during the past year in newspapers, magazines and promotional literature sent out by gas companies in which the backing of Electrolux by the gas industry was emphasized.

Many of the visitors at the exhibit this year are owners of Electrolux refrigerators, all of whom have expressed satisfaction with their purchases.

Adjacent to the Electrolux exhibit are the displays of several model all-gas kitchens set up under the auspices of the American Gas Association. In each of these kitchens, an Electrolux refrigerator forms part of the appointments.

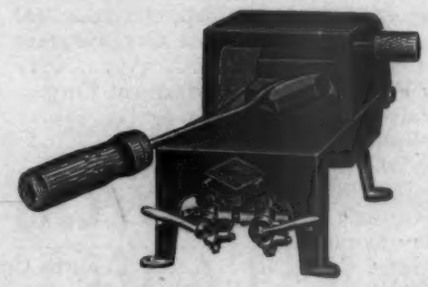
Electrolux refrigerators are on view in other parts of the Fair grounds, notably in the nursery of the Baby Incubator exhibit and in the model Emergency Hospital in the Hall of Science.

Mercoid Safety and Ignition Controls Leaflet

The Mercoid Co., 4201 Belmont Ave., Chicago, Ill., have issued a four page leaflet in colors, illustrating and describing their "K" line safety and ignition controls. Copy will be mailed on request.

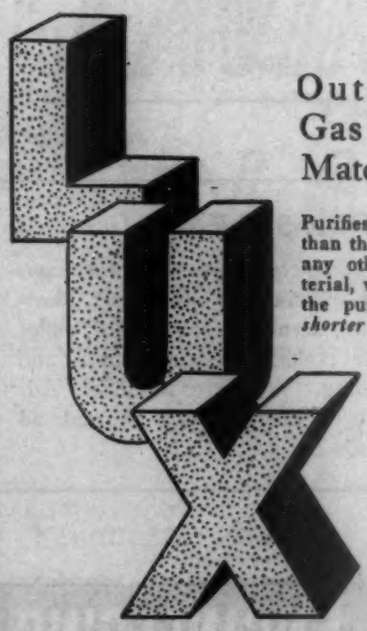
PURIFYING MATERIAL — BAGGED, OR IN BULK
Manufacturers of GOVERNORS, APPARATUS and EQUIPMENT
IRON SPONGE
Connelly Iron Sponge and Governor Co.
Elizabeth, N.J.
Chicago
1876 [USE THE BENEFIT of 58 YEARS EXPERIENCE] 1934

A GREAT BENCH FURNACE



The Johnson No. 101 Bench Furnace well deserves its widespread popularity. It is strong, efficient, inexpensive. Designed for heating soldering coppers up to 12 pounds per pair, and for heat-treating carbon steel tools and parts. Two powerful Johnson Direct Jet Burners supply quick, intense heat without forced air blast. Write for details.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA



The Outstanding Gas Purifying Material » » »

Purifies *much more* gas than the same quantity of any other purifying material, while it also effects the purification in much *shorter time.*

Write for interesting booklet

THE ALPHA-LUX COMPANY, Inc.
192 Front St., New York
Philadelphia **Chicago**

ADVANTAGES

CONNERSVILLE METERS OFFER MANY DESIRABLE ADVANTAGES

Small size Connersville Meter measuring natural gas to engine in large plant which pumps coke oven gas up to line pressure. The Meter handles about 25,000 cu. ft. per hour, at pressures which vary from 6 to 30 lbs. Advantages of this type of Meter are briefly summarized, as follows:

1. **No danger of collapsing Meter due to suction of the gas engine;**
2. **Accurate and fool-proof—easily read—consumption recorded hourly;**
3. **Years of trouble-free service insured by its sturdy construction;**
4. **Impossible to get out of adjustment—displacement machined in;**
5. **Low operating differential, and minimum maintenance expense.**

Write for Bulletin 40-B10

Roots CONNERSVILLE
BLOWER CORPORATION
12th & Columbia — CONNERSVILLE, IND.

New York—Chicago—Pottstown, Pa.
Boston — Pittsburgh — Detroit — St. Louis—San Francisco—Los Angeles

GPM
IRON HYDROXIDE

Low Cost
Efficient Purification
Minimum of Attention
Technical Service

CONSIDER THESE FACTORS AND SPECIFY GPM IRON HYDROXIDE

Gas Purifying Materials Co. Inc.
Foot of Halsey St, Long Island City, N.Y.
Branch Yard, Providence R.I.

Index To Advertisers

Alpha Lux Co., Inc.	49
American Gas Products Corp.	41
American Meter Co.	6
Andale Company	51
Byllesby Engineering & Management Corp.	51
Chace Valve Co., W. M.	43
Chaplin-Fulton Mfg. Co.	43
Connelly Iron Sponge & Governor Co.	48
Connersville Blower Co.	49
Cruse Kemper Co.	47
Doubleday Doran Co.	42
Dresser Mfg. Co., S. R.	Fourth Cover
Electrolux Refrigerator Sales, Inc.	2
Gas Purifying Materials Co.	50
Improved Equipment-Russell Engr. Co.	50
Isbell-Porter Co.	51
Johnson Gas Appliance Co.	49
Kitson Company	47
Lambert Meter Co.	45
Lattner Mfg. Co., P. M.	44
Lavino & Co., E. J.	51
Linde Air Products Company	4 & 5
Morrison Hotel	45
National Tube Co.	8
Oxweld Acetylene Company	4 & 5
Prest-O-Lite Co., Inc., The	4 & 5
Reynolds Gas Regulator Co.	45
Robertshaw Thermostat Co.	Front Cover
Roots-Connersville Blower Corp.	49
Safety Gas Main Stopper Co.	50
Sprague Meter Co.	47
Superior Meter Co.	43
Union Carbide and Carbon Corp.	4 & 5
Union Carbide Sales Company	4 & 5

THE GOODMAN STOPPER

The Reliable Shut-Off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, New York

FOR SALE

FOR SALE: One complete carburetted water gas plant consisting of one six-foot GMCO set, blower, purifiers, washer, scrubber, compressor, relief holder, oil storage tanks, accessory pumps and Truscon steel building. We invite inquiries. Address Box #1054 c/o American Gas Journal, 53 Park Place, N. Y. C.

IMPROVED EQUIPMENT ~ RUSSELL ENGINEERING
CORPORATION
24 STATE STREET
NEW YORK
Coal Gas Plants — Horizontal Ovens, Benches, Refills, Additions, Repairs, Charging and Discharging Machines
Oil Gas Plants — "Refractory Screen" Process for Base — Standby or Peak Loads — On Existing or New Water Gas Sets Low or High B.T.U. Gas

HEATING BUNKER "C" OIL

for carburetting gas requires high pressure and high temperature.

ANDALE BOWED TUBE HEATERS

remain tight and are easily cleaned. These are the requirements for continuous satisfactory operation.

ANDALE COMPANY

1600 ARCH STREET

PHILADELPHIA

Byllesby Engineering and Management Corporation

Wholly-owned subsidiary of

Standard Gas and Electric Company

231 South La Salle Street, Chicago

New York Pittsburgh San Francisco

LAVINO OXIDE

High Total Sulphur Absorption at Minimum Cost. Intensely Active.

"THE EFFICIENT PURIFIER"

The Sponge with the large Tough Shavings Always Uniform

LAVINO SPONGE

E. J. LAVINO and COMPANY - BULLITT BLDG. - PHILADELPHIA, PA.

NEW YORK CHICAGO PITTSBURGH

ISBELL-PORTER COMPANY

Engineers and Contractors for Complete Gas Works

I-P C

Manufacturers of All Kinds of Gas Apparatus

NEWARK - NEW JERSEY

The MODERN Clamp

. . . THE GREATEST FORWARD STEP EVER ACHIEVED IN BELL JOINT EFFICIENCY . . . . .

Laboratory and field results have definitely proved that the Dresser Bell Joint Clamp, Style 60, is so efficient that it eclipses any other device ever built for keeping bell and spigot joints tight.

A high minimum gasket pressure on the bell face and pipe spigot is assured for the first time. Along with this feature, Style 60 combines simplicity with sturdiness, adjustability with ease of installation, permanence with economy, laboratory proof with field proof.

To beat the efficiency of the Dresser Style 4½ HP Clamp, it was necessary to do more than offer a different design, or to provide mere adjustability. It was essential to produce in Dresser Laboratories a totally new type of testing apparatus that would reveal, scientifically and accurately, the relation of clamp design to performance. This presearch led to the Dresser Sealometer—the gasket pressure gage, which made possible an entirely new method of studying gasketed joints.

Thus the modern Dresser Clamp is the culmination of three years of development, and it effects a genuine advance in bell joint efficiency.

S. R. DRESSER MFG. COMPANY • BRADFORD, PA.

In Canada: Dresser Mfg. Company, Ltd. •

DRESSER

BELL JOINT CLAMPS